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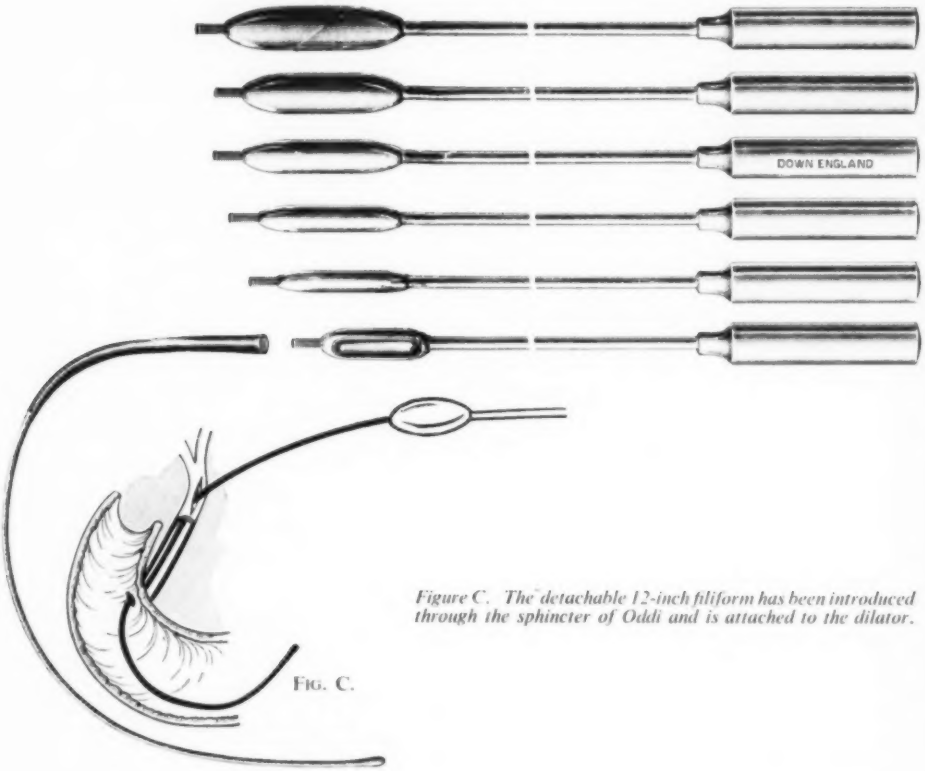

Figure C. The detachable 12-inch filiform has been introduced through the sphincter of Oddi and is attached to the dilator.

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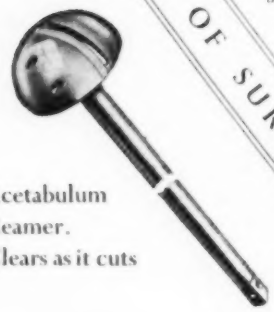

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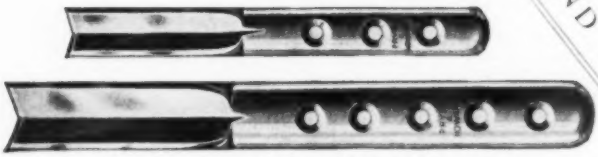

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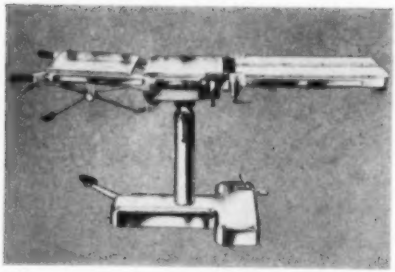

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HYDATID DISEASE AFFECTING THE NERVOUS SYSTEM

Hunterian Lecture delivered at the Royal College of Surgeons of England

on

7th October 1959

by

Richard G. Robinson, *G.M.*, Ch.M., F.R.C.S., F.R.A.C.S.

From the Department of Neurosurgery of Dunedin Hospital and University of Otago Medical School, Dunedin, New Zealand

JOHN HUNTER WOULD have been familiar with hydatid cysts in the organs of many of the animals which he dissected. The parasitic nature of the cysts and of the mature worm were recognized by Pallas (1766) and by Goeze (1782) before Hunter's death (1793). However, the details of the life-cycle of the worm and its pathological effects were not worked out until the first half of the nineteenth century. For this the experimental method was essential. Even now, there is much to be learnt, and the ultimate experiment of prevention has yet to be performed.

EPIDEMIOLOGY

The biological importance of the hydatid parasite cannot be ignored, and it has become of increasing concern to public health authorities. Hydatidosis is a significant member of a group of diseases called zoonoses. These have been defined as " those diseases and infections which are naturally transmitted between animals and man " (WHO/FAO, 1959). The disease is due to a cestode worm, *Echinococcus granulosus*. This interesting piece of biological engineering needs both a carnivorous and a herbivorous mammal to complete its life-cycle. In the domestic situation the dog is the primary host and the sheep the intermediate one where cysts are formed. The cystic part of the cycle can also occur in cattle, swine, goats, horses, camels and man. In other circumstances wolves, jackals and dingoes harbour the adult worm, and the elk, moose, reindeer, wallaby and kangaroo become intermediate hosts. This is designated the sylvatic cycle. As far as New Zealand and many other countries are concerned, the domestic cycle is the only one. However, in Great Britain, there is some doubt about the fox as a vector for the disease (Taylor, 1958; Gemmell, 1959).

The disease was familiar in Europe, but the settlement of Australia with the sheep and the dog emphasized the malignant nature of the disorder to the pioneers who had every reason to hope for a healthy environment. Between 1868 and 1881 in the State of Victoria, Australia, there were 500 deaths and about 3,000 people infected with hydatid disease from a population of 860,000 (Thomas, 1884). The disease was of similar

concern in New Zealand (Macdonald, 1888). The two definitive accounts of the disease have come from Australia, by Thomas (1884, 1894) and by Dew (1928).

The English textbooks have associated the condition with such distant parts as Australasia, southern South America, Iceland and the nearer remoteness of the Orkneys and Hebrides. There is no doubt that in these places the disease is a major problem, to which must be added the Mediterranean littoral and the Middle East (WHO/FAO, 1959). Records from Asia are scanty because malaria, cholera and plague are of more immediate importance and doctors are few.

The Canadians have begun to recognize the disease in the North American Indians and Eskimos (Poole, 1957), where the sylvatic cycle is of importance. The position in the United States of America is obscure as most authorities class that country amongst the endemic areas of the world, yet human incidence appears very low (Schwartz, 1957).

New Zealand's position is unenviable, as there is a death rate of 6.23 per million from hydatid disease (Foster, 1958). There are also nearly ninety new cases of the disease admitted to hospital a year from a population of some two millions. It will come as a surprise for many to learn that the Registrar-General records 171 deaths from hydatidosis in England and Wales alone in the twelve years from 1945 to 1957 (Registrar-General, 1958; Bradley, 1959). Further, there will be over a thousand new admissions to hospital in that time. The gross figures are the same as for New Zealand, but in terms of deaths per million the figure is only 0.31, or about twenty times less common. However, comparisons are difficult as in England and Wales only a small percentage of the 43½ million population, of whom 650,000 are farm workers, are at risk, while a large proportion of New Zealand's two million have opportunities for infection. There are nearly twice as many sheep in New Zealand, where the dog is no sacred animal and less common as a pet or sporting animal.

Wales is popularly supposed to be the main reservoir of infection in Great Britain. Thus in 1937, Professor Lambert Rogers drew the attention of the Welsh Board of Health to hydatid disease in South Wales (Howell, 1938; Wolfe, 1943). Statistics on the present-day situation do not exist, but data from meat inspectors suggest that the infection is quite rare in carcases of sheep and cattle in the Cardiff slaughterhouse, but is not uncommon in the Birmingham one (Taylor, 1958). Taylor (1959) has information that in the Hebrides about 50 per cent. of the sheep have hydatid cysts. The Ministry of Health (Bradley, 1959) does not have any figures on the location or morbidity of the human disease in Great Britain. It is probable that there is an area of infectivity which is far worse than anything that there is in New Zealand, but a survey will be needed to define it.

HYDATID DISEASE OF THE BRAIN

Historical

One of the earliest successful posterior fossa craniotomies is attributed to Maunsell of Dunedin, New Zealand, in 1889, when he operated upon a subtentorial hydatid cyst. Only earlier had Schwartze in 1887 and Macewen in 1889 trephined for cerebellar abscesses, while a cerebellar tumour was not removed until 1893, by McBurney (Green, 1951).

Henry Widenham Maunsell (1847-1895) was an Irishman, who a year after qualification went to Australia and was Resident Medical Officer to Melbourne Hospital. He crossed to New Zealand in 1871 and practised in the mining district of Hokitika. From 1876 to 1891 he was in Dunedin, where the Otago Medical School was situated. Owing to ill-health, he returned to England in 1891 and practised in South Kensington, but without a hospital appointment, until his death in 1895.

Maunsell belonged to the era when the whole body was in the province of the general surgeon. He was for ever trying new technical devices in the developing field of abdominal surgery. In 1886, he devised an extra-peritoneal method for dealing with the cervical stump after a supravaginal hysterectomy (Maunsell, 1887a); and was advocating suprapubic laparotomy for treating strangulated femoral hernia (Maunsell, 1887b). He reported in 1892 (Maunsell, 1892) on an ingenious method of intestinal suture designed to replace the Murphy button. This was well received throughout the world, but it was superseded by better techniques.

Maunsell's posterior fossa craniotomy was done at Dunedin Hospital (Maunsell, 1889). The patient was a man of 18 years of age who had had a nine-month history of headaches, vomiting and staggering to the right. He became blind and deaf, and there was neck retraction and spasms of convulsions on the left side. Medical treatment did not help him and the case was seen in consultation with Dr. Daniel Colquhoun, a prominent physician in Dunedin and the Otago Medical School. They made a diagnosis of a left cerebellar tumour and recommended an operation for its removal, without delay [*sic*]. The left side was selected because vision and hearing had deteriorated on that side first.

On 21st February, 1889, the head was shaved and cleaned. Chloroform was given; the patient was turned on to his face and pulled well over the end of the table so that the upper two-thirds of his chest was free. The head was rested on the lap of a seated assistant. A semilunar incision was made from mastoid process to mastoid process and a flap of muscles was dissected away from the occipital bone and the foramen magnum area. Both occipital arteries were tied. A large trephine hole was made in the left side of the occipital bone and as the trephine passed through the bone some ounces of clear fluid spurted out. The bone disc

was removed and inspection through the torn dura showed a subtentorial hydatid cyst [*sic*]. This was so big that the surgeon's finger could not touch the bottom, and as measured by a uterine sound was 4 ins. long by 3 ins. broad. The cerebellum was compressed to the right and the tentorium was raised 2 ins. (Fig. 1).

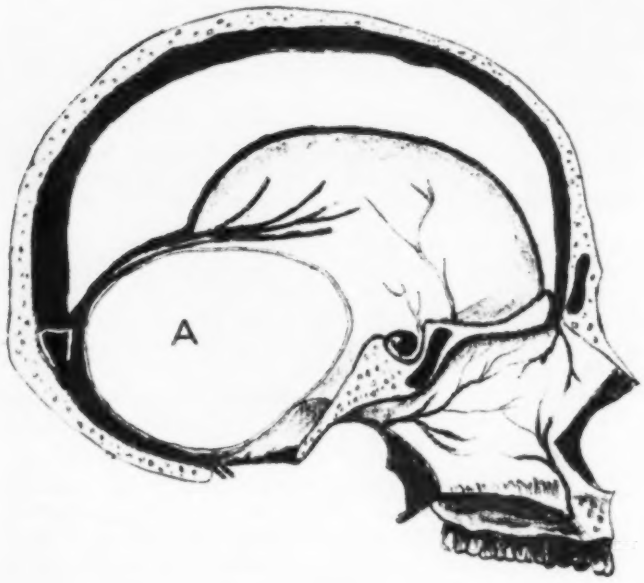

Fig. 1. Maunsell's drawing of his subtentorial hydatid cyst. (From Maunsell, 1889.)

Nothing further was done to the cyst and the area was cleaned with a weak solution of mercury perchloride. A drain was placed in the cavity, and the margins of the wound were sutured with silkworm gut and horsehair. A dry aseptic dressing was fixed to the wound. The operation took 70 minutes.

Healing was uneventful. By 30th March he had fully recovered and appeared very intelligent. The sole disability was blindness. He is believed to have remained well for at least another fifteen years and earned his living as an itinerant salesman (Mullin, 1957). The case report ends

with a tribute to Horsley and Macewen, but Maunsell cannot have seen them at work, because, as far as is known, he was last in Europe in 1876.

There must be considerable doubt as to the nature of this cyst. That such a cyst was hydatid would have been taken as self-evident at that time and only rarely was pathological examination done in verification, which was not done in this case. Further, the posterior fossa is an uncommon site for a hydatid cyst (Thomas, 1884). The method of treatment was such that the operative area was contaminated and a rapid recurrence would be probable. It is possible that this was a cystic astrocytoma, but survival for fifteen years without removal of the mural tumour makes this unlikely (Robinson, 1953). There are benign cysts such as arachnoid cysts and those of the kind described by Handa and Bucy (1956); such a lesion would seem more feasible. Although the lesion does not seem to have been removed, this operation in 1889 remains a remarkable one, and we could not have done better today. The first successful removal of a proven hydatid cyst of the brain in Australasia was that of Graham and Clubbe in Sydney in 1890.

The early numbers of the *New Zealand Medical Journal* (1887-1896) record several successful brain operations. Colquhoun, the physician, in 1890 diagnosed and removed with success a large meningioma from the right Rolandic area. He pays tribute to the assistance of Maunsell for this operation.

Pathology

It is a paradox that in the head hydatid cysts are intracerebral and only rarely extradural, while in the spine the cysts are extradural and an intrathecal one is an event of great rarity.

The brain is one of the less common sites for a hydatid cyst and about 2 per cent. of patients with the disease have a lesion so located. In New Zealand, about 1 per cent. of all space-occupying lesions are hydatid cysts, but the incidence is much higher if only those under the age of twenty-one are considered. It is uncommon for such patients to have clinical evidence of a cyst elsewhere; thus cerebral cysts are often called primary.

The pathological features of hydatid cysts in the liver and lungs are well-known. At these sites, there is a considerable adventitial reaction by the host to produce an ectocyst. This reaction is minimal in the brain so that the brain is merely compressed or pushed aside by the expanding cyst. Although there is some gliosis of the adjacent brain, there is a perfect plane of cleavage between the cyst and the brain.

There are records of twenty cerebral hydatid cysts in New Zealand going back to 1888, but accurate details are missing in two (Begg, Begg and

Robinson, 1957). Only one was in the posterior fossa and the rest were in the cerebral hemispheres, where fourteen were in the parieto-occipital area and three were frontal. Fifteen of the seventeen were on the right, and the cysts were 7 cm. or more in diameter.

Clinical features

While a cerebral hydatid cyst may develop at any age, only three in our series were over twenty-one years of age, with the oldest at thirty-four years of age.

The symptoms are those of any expanding intra-cranial mass with headaches and vomiting predominating. This is followed by a one-sided weakness and sometimes epileptic fits. Examination may show a large head. Papilloedema is common and well-marked. A homonymous hemianopia will often be found but it may be difficult to elicit it in a child. The hemiplegic signs vary from a mild ataxia to a spastic weakness, but a gross paralysis is unusual. Sensory signs of the cortical type are hard to discover in the young, but are present if the examination is persisted with.

The Casoni reaction and the hydatid complement fixation test are disappointing in their result for the cerebral manifestations of the disease. A positive result was obtained in only two of nine patients. The eosinophil count of the blood may be raised, but this usually goes with a positive serological test.

Radiology

Good radiographs of the skull are of considerable value. Under the age of about ten years spreading of the sutures can be seen. The skull is thinned and in some instances there is a local bulging of the parietal bone. Only rarely will the pineal gland be calcified so that its shift can be detected. Calcification in the cyst's wall is very uncommon.

When ventriculography was the sole method of special radiological investigation, the parieto-occipital location of the cyst made puncture inevitable and was responsible for the high recurrence rate. Ventriculography by anterior burr holes does not obviate the risk either. It is common to see cystograms exhibited with pride in the literature, but such should be an occasion for shame. We have made this mistake but I think that we have profited from our errors of judgment.

Cerebral arteriography has altered all this and it should be possible to locate any hemispheral hydatid cyst at any age by this means. There is a marked displacement of the cerebral vessels. The vessels may run in a circumferential fashion, but the cyst is avascular.

Differential diagnosis

The differential diagnosis is from that of other kinds of space-occupying lesions. Where hydatidosis is prevalent any young person who has the clinical features of a supratentorial tumour should be suspected of having a hydatid cyst (Phillips, 1948). In the cooperative child the presence of a homonymous hemianopia and sensory signs are an indication that the raised intracranial pressure is due to a lesion outside the posterior fossa. When the child has deteriorated and is uncooperative the wrong interpretation of the unsteady gait may be made and ventriculography done with unhappy results. A diligent search for an hemianopia will reduce such risks.

Treatment

A properly removed cerebral hydatid cyst is one of the lesions of the brain where hopes of cure are high. The key to the successful management is that the cyst must remain intact, both during diagnostic procedures and removal. Its capsule is amply strong enough for this purpose. The method of aspiration of the fluid content and replacing it with dilute formalin solution as used in the liver and lungs has no place in the intracranial lesion. It is the germinal membrane and daughter cysts and not the scolices which are responsible for recurrences.

The skull is opened by a large osteoplastic flap, when the thinness of the bone may be seen. The dura is opened without difficulty, but I have seen a case where the cyst was adherent to it, but a plane of cleavage was found easily. If the cyst has not presented at the surface, the brain must be dissected with only a blunt instrument. The cyst is unlikely to be more than 2 cm. from the surface. Its wall has a yellowish appearance like latex rubber which is unmistakable. When the cortical incision is enlarged, the cyst has a spontaneous tendency to extrude. A soft rubber catheter is insinuated between the cyst wall and the brain, and saline solution is injected into the plane of cleavage. The cyst is floated out, delivered intact and never handled with instruments. This method has been used since 1951 (Robinson, 1953; Begg and others, 1957) and a similar one was described by Arana-Iniguez and San Julian (1955) independently. There is no bleeding from the bed of the cyst and the dead space is filled with saline solution before closure. If by an error in technique the cyst has been punctured in removal, a recurrence is likely within two years, but is by no means inevitable. There has been no recurrence in our recent cases and there has not been an operative death (Begg and others, 1957).

THE SPINE

Pathology

The pathology of hydatidosis of the spine is that of bony disease elsewhere, but with the proximity of the spinal cord as a complication. As in

the brain, the adventitial reaction of the host is minimal so that no ectocyst is formed. While in the brain this allows the cyst to be removed intact, in bone it permits a dissemination of the disease which is virtually incurable. About 1 per cent. of patients with hydatidosis develop the bony form of the disease and of these about half will have their cysts located in the vertebral column. Many have clinical manifestations of the disease in the liver and lungs as well.

According to the classical work of Dévé (Grisel and Dévé, 1929), the disease shows an increasing frequency towards the caudal end of the spinal

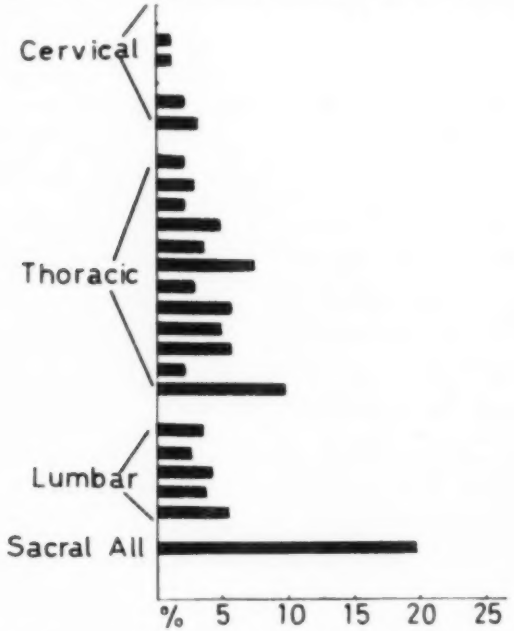

Fig. 2. Incidence at various vertebral levels of hydatidosis of the spine. (Redrawn from Grisel and Dévé, 1929.)

column. There is a moderate density from T.6 to T.12, but the level of greatest incidence is in the sacrum, which accounts for some 20 per cent. of cases (Fig. 2).

The parasite lodges in the medullary cavity of the bone and the cyst is always small. Little out-pouchings of the cyst occur which become detached to form more cysts. These insidiously infiltrate and erode the marrow so that the centre of the bone becomes filled with a mass of tiny cysts. The process spreads into the pedicles and laminae and at thoracic

levels the head of the rib becomes involved. It is a characteristic of the disease that the intervertebral disc is spared and usually only two adjacent vertebrae are affected. Ultimately, the vertebra collapses, but a marked gibbus only happens in about 10 per cent. of patients. This is probably because the whole bone is eroded and the vertebra collapses like a concertina; while in tuberculosis the disease spares the posterior elements of the spine, thus allowing a hinging action with the production of a gibbus.

The cysts break through into the paravertebral tissues and form a large mass in the paravertebral gutter, but the pleura and peritoneum are not invaded. It is almost unknown for a pulmonary hydatid to spread directly into the vertebral column. Calcification may occur in the paravertebral cysts. Posteriorly the muscles are invaded but the disease loses its polycystic nature and becomes a single cyst which may bulge out beneath the skin. Multiple cysts in this situation are due to surgical intervention. As the microcysts destroy the bone they encroach upon the spinal canal and compress the spinal cord; a paraplegia follows in about 25 per cent. of patients. The dura remains intact and an intrathecal cyst is very rare.

Clinical features

Hydatidosis of the spine has its greatest incidence in the third decade of life. Males are only slightly more affected than females. The clinical syndrome is essentially one of spinal deformity, paravertebral tumour and paraplegia. The spinal movements tend to be well-preserved, and pain and tenderness are not great. When a large mass presents over the spine trans-illumination becomes possible. Gross spinal deformity is not marked. As the sacrum is so commonly affected sciatica and sphincter disturbances are the common complaints. At higher levels root pains precede the paraplegia by some considerable time.

The radiographs show a quiet necrosis of the bone with a minimum of cortical and periosteal reaction. The pedicles, laminae, transverse processes and ribs are eroded in an asymmetrical fashion. The shape of the body of the vertebra has been likened to that of a coffee bean. Collapse occurs late and calcium may be seen in the paravertebral tissues.

The main differential diagnostic problem is tuberculosis. Pain, fever, bony reaction and destruction of the intervertebral disc are all indications of tuberculosis. Haemangioma and osteoclastoma are difficult lesions to exclude. Malignant disease has a much shorter time course. Perineural sacral cysts give real difficulty in the differential diagnosis, but a myelogram would be diagnostic. The various difficulties may only be resolved by surgery, but aspiration of a paravertebral mass may show the characteristic contents of a hydatid cyst.

Treatment

We have had three unhappy experiences with hydatid disease of the spine and they are reported elsewhere in full (Robinson, 1960). One case had the disease in the lower thoracic area, while two had compression of the cauda equina, one from a lesion of the fourth lumbar vertebra and the other from the sacrum. The thoracic patient died after many operations and prolonged suffering. Permanent cure after a long illness was achieved in the sacral case, but this was only due to the supervention of a wound infection. It was hoped that an enduring remission had been secured in the lumbar case (Case 1), but since the report a massive recurrence has occurred.

All who have had to deal with hydatidosis of the spine have realized the palliative nature of the surgery and the ultimate fatal outcome of the disease. In other bones, amputation offers some hope of cure and this has even been attempted for the lumbar spine (Del Campo, 1948). Surgery cannot heal the disease and may serve to disseminate it. If the diagnosis can be made without surgery then conservative measures are justified. The indication for a decompressive operation is a paraplegia or a severe cauda equina syndrome. The immediate results are often good, but the ultimate outcome is poor, but may be long delayed.

Dévé was so impressed with the hopelessness of the surgical treatment that he suggested that a deliberate attempt should be made to infect the area with an attenuated staphylococcus (Dévé, 1935). It has been well known that a surgical infection sometimes effected a cure if the patient survived the hazard. This happened in one of our cases, but it would be a brave man who deliberately did this, even with antibiotics.

PREVENTION

Generally, the methods of treating hydatidosis are not particularly successful. New Zealand experience suggests that at least 30 per cent. of those patients treated for the first time are going to need further admissions to hospital for surgical measures and the average stay for a patient in hospital is fifty-four days (Foster, 1958). There is no known drug which will kill the parasite either in the primary or in the intermediate hosts. Arecoline hydrobromide is a reasonable vermifuge in the dog, but it needs regular and supervised administration to be effective. The only way that remains is to try and break the life-cycle between the dog and the sheep. The life of the tapeworm is about six months after maturity, so that unless the dog is re-infected he will become clear of the parasite in about eight months (WHO/FAO, 1959). Thus the dog must be denied access to the raw offal of sheep and cattle and it is this step that has been so difficult to effect. It is not just offal condemned for human consumption but of any offal except that which has been properly cooked. The

farmer kills sheep for domestic consumption and the dog is fed accordingly. While dogs are supposed to be excluded from abattoirs, enforcement is by no means adequate. Many sporting dogs are fed raw offal by their keepers and there is good evidence that many greyhounds and foxhounds are so infected (Taylor, 1958). The amount of infestation that is got from the dead sheep's carcase in the hills is an unknown quantity, but it is unlikely that a well-fed sheepdog would savage such a carcase.

The basic facts for the control of the disease have been known since the end of the last century, but where the disease has been reduced good luck has helped the issue. Dungal (1957) has related how, in Iceland, by the enforcement of proper hygiene the disease has been reduced to negligible proportions. However, at the same time there was a change in farming practice and lambs instead of wethers were used as a source of meat. Lambs always show less cystic disease than adult sheep.

Experience in New Zealand has shown that one cannot legislate for health without the cooperation of the community. There has been no change in the incidence of hydatidosis in man over the last thirty years (Foster, 1958). Recently the problem has been tackled anew. A Hydatid Research Unit has been formed, whose first task was to assess accurately the incidence of the parasite in the animal population. It has undertaken a field experiment in the control of the disease which has shown that it is possible to reduce the infectivity rate in sheep to negligible amounts (Gemmell, 1958). At the same time several human agencies have become interested. In the past the propaganda side of the preventive measures had been the issue of a few pamphlets to farmers and dog owners. Now the various farmers' unions, dog clubs and societies interested in the welfare of women and children have taken a hand. Thus social and domestic pressures exist for the delinquent farmer to feel ashamed when his sheep and family are found to harbour the parasite. Dosing the dogs is a skilled job and cannot be left to the famer, so this is going to be in the hands of trained people and the cost is being recovered by increasing the dog licence fee. A similar measure has been found necessary in Argentina. Hydatidosis can only be controlled by the cooperation of the dog user, reinforced by persuasion, publicity and constant exhortation. A re-assessment of the problem in Great Britain is called for, where the challenge to public health authorities, veterinarians and dog owners has yet to be met.

ACKNOWLEDGMENTS

It is a pleasure to record the help and encouragement of Mr. M. A. Gemmell, B.V.Sc., Director, Hydatid Research Unit, and Dr. N. C. Begg, Medical Director, Plunket Society, as to general aspects of hydatidosis in New Zealand. I am indebted to Mr. A. James, F.R.A.C.S., for access to the records of the Department of Neurosurgery and for permission to use his cases.

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RECENT OVERSEAS VISITORS TO THE COLLEGE

Recent overseas visitors to the College have included the American Ambassador, Mr. John Hay Whitney, C.B.E., and Mrs. Whitney; Professor John Loewenthal, F.R.C.S., Professor of Surgery in the University of Sydney, and Mrs. Loewenthal, who attended the monthly dinner in February; Dr. Bradley Coley, who delivered a Moynihan Lecture in the College on 11th February, and Mrs. Coley, who also attended the monthly dinner in February; Professor E. G. Sayers, C.M.G., F.R.C.P., Past President of the Royal Australasian College of Physicians, who stayed in the Visiting Professors' Flat in the Nuffield College; and Professor W. K. Livingston from Portland, Oregon.

TUMOURS OF THE SALIVARY GLANDS

Hunterian Lecture delivered at the Royal College of Surgeons of England

on

July 10th 1959

by

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PART I

IT IS APPROPRIATE to commence this lecture on tumours of the salivary glands by telling an anecdote which might have appealed to the great John Hunter, in whose honour this lecture is given. It is taken from Packard's *History of the Pennsylvania Hospital of Philadelphia*, 1751–1938. Packard tells the story about the renowned Philip Lyng Physick, who had, in his earlier days, come to England to study under John Hunter as one of his " house pupils ". Later he returned to Philadelphia carrying John Hunter's philosophy and precepts with him to become the " father of American Surgery ". It appears that in 1805 Physick successfully removed a large tumour from the head of a man. This created so much interest that it was reported in Paulson's *American Daily Advertiser*—the public press of that day. The tumour was preserved as a museum specimen. Not until 1924, one hundred and twenty years later, was it examined microscopically, by Dr. John R. Paul, the then hospital pathologist, and now Professor of Epidemiology at Yale. He found it to be a mixed tumour of the parotid gland. Dr. Packard laconically remarks that surely this must constitute a record for delay in receiving the final pathological report on an excised specimen without protest from the operating surgeon.

This story is indicative, to some degree, of the confusion which has existed until recent years on the subject of the origin and pathology of salivary gland tumours. The accepted form of treatment has also been much in dispute. It is currently taught that salivary gland tumours are relatively insensitive to radiation. Most surgical textbooks make this statement and it is repeated and copied from one edition to the next. However, in the Province of Saskatchewan in Canada, the usual treatment of parotid tumours has been by surgery plus irradiation, carried out under the direction of the Saskatchewan Cancer Clinics. This treatment is used whether the tumours are benign or malignant. It is true that Ahlbom of the Radium Hammett Institute in Stockholm had advocated this type of therapy in 1935, calling it radio-surgery, but few other centres followed his lead.

As the free use of irradiation of these tumours had been in vogue in Saskatoon over the past 25 years, it seemed reasonable to review the results obtained by this treatment. Accordingly, four of us, Dr. T. A. Watson, Clinical Director of the Saskatchewan Cancer Commission; Dr. D. F. Moore, Professor of Pathology in the University of Saskatchewan; Dr. D. G. McEachen, Surgical Fellow in Pathology, and myself reviewed all the case records of patients suffering from salivary gland lesions, who had been seen at the Saskatoon Cancer Clinic between the

TABLE I

TUMOURS OF THE SALIVARY GLAND TISSUE

	No.	*Per cent. Incidence*	*Per cent. Recurrence*
Benign			
Mixed Tumours	79	61.2	6.5
Adenolymphoma	6	4.4	nil
Malignant			
Mixed tumour	17	34.6	35.0
Carcinoma	27		
TOTAL	129		

years 1932–1956. The follow-up on these patients was complete. All patients had been seen at regular intervals up until the time of review, or until they had died. Drs. McEachen and Moore reviewed and checked all the histological slides of these lesions, except for seven which were not available. They reclassified the lesions where necessary.

The first part of this lecture, therefore, deals with the results of this review, and is an endeavour to show that radiation does have a beneficial effect in controlling salivary tumours. An appendix is added to this report setting out the author's views on the adequate surgical technique to be employed in excision of parotid tumours. The second part of the lecture deals with results of a research investigation into the effects of irradiation of varying intensity upon the parotid glands of rats.

Between the years 1932 and 1956 there were 155 salivary gland lesions seen at the Saskatoon Cancer Clinic. 129 of these lesions were tumours and the remaining 26 were of a miscellaneous nature and these need not be discussed. Table I sets out the broad distribution of these tumours with their relative incidence and their crude recurrence rates. It will be noted 85 were benign and 44 were malignant. This distribution is reasonably comparable to most of the recorded series. The anatomical sites and pathological types of the various tumours are set out in Table II. It will be noted that 111 occurred in the parotid gland, 12 in the submaxillary gland and none in the sublingual gland. Six occurred in such ectopic sites as cheek, lip and palate.

TABLE II

TUMOUR DISTRIBUTION

Tumour	*Parotid*	*Sub-maxillary*	*Sub-lingual*	*Ectopic*	*Total*	*Per cent.*
Benign mixed	72	2		5	79	61
Malignant mixed	11 + (1)*	5			17	
Muco-epidermoid carcinoma	4 + (1)*				5	
Squamous cell carcinoma	4 + (2)*				6	
Adenocarcinoma						34
Adenoid cystic	4	1			5	
Trabecular	1	1			2	
Mucous cell		1			1	
Acinic cell		1			1	
Unspecified	2 + (3)*	1		1	7	
Adenolymphoma	6				6	5
TOTALS	111	12	0	6	129	100

* Tissue slides not available for recheck.

Benign tumours

Adenolymphoma. There were six adenolymphomas or Warthin's tumours, which all occurred in the parotid gland. Clinically, they are indistinguishable from parotid salivary tumours, but histologically they are distinctive and unmistakable. They consist of tall columnar eosinophilic cells with a lymphoid stroma. It is important to realize that they are always benign, that they can be readily shelled out, and that they do not recur, so that no treatment other than surgical enucleation is required.

Benign mixed tumours. Many names have been used for these tumours, but probably the best is that given by Eddy, viz. Pleomorphic Adenomas, since they consist of variable amounts of epithelial and connective tissue, and arise from salivary gland tissue. The connective tissue supplies the pleomorphism. There were 79 such tumours, 72 in the parotid gland, 2 in the submaxillary gland and 5 in ectopic sites. 62 of them were regarded as " primary " cases, i.e. they had not had any previous treatment before coming to the Cancer Clinic. 17 of these cases had had previous unsuccessful treatment elsewhere and had recurred. The recurrence rates for these two groups and the overall recurrence rate of 6 per cent. are set out in Table III.

TABLE III

BENIGN MIXED SALIVARY GLAND TUMOURS

	Total No.	*Recurrences* *No.*	*Per cent.*
Primary cases	62	2	3
" Secondary " cases	17	3	18
TOTAL CASES	79	5	6

It is well known that these tumours may recur years after previous excision and MacFarland quotes a case recurring 47 years after the first treatment. However, it is generally conceded that the majority of recurrences appear within 5 years and therefore, for the purpose of this review, a five-year yardstick has been taken to assess the efficacy of treatment.

39 cases out of the 79 with benign pleomorphic adenomas had been treated 5 years before or longer; 38 of these were alive and free of recurrence. One died of intercurrent disease and, as far as is known, was free of recurrence at the time of death one year after admission to the clinic. (Eight years prior to admission to the clinic he had had an excision.) Of these 39 cases treated 5 years ago or longer, 26 were " primary " cases and 17 were recurrent cases. Table IV sets out the details of the treatment

TABLE IV

BENIGN MIXED SALIVARY TUMOURS IN 26 PATIENTS ADMITTED TO CLINIC MORE THAN 5 YEARS AGO AND " PREVIOUSLY UNTREATED "

Type of treatment	*No.*	*Results*
Local excision only*	10	10 well at 5 years None have had recurrence
Local excision and radiation	15	15 well at 5 years 1 recurred at 3 years, treated by further excision and well at 6 years
Radiation only	1	1 well at 5 years Recurred at 7 years, excised and well 12 years later
TOTAL	26	All free of tumour at present time

" Previously Untreated " includes those patients who had had an excision within 6 weeks of admission to clinic and had post-operative radiation treatment on admission.

* One of these patients had a " radical resection ".

of these primary cases and the results. It will be seen two recurred and required further excision, but all 26 are at present free of recurrence.

Table V sets out the treatment and results of the 13 recurrent cases seen 5 years or more ago. It will be seen 3 of these recurred, but it will be noted that all 8 who had local excision plus irradiation were free of further recurrence at 5 years. In Table IV, it will be noted that 10 cases had local excision only and none of these recurred. From this it might be inferred that local excision was an adequate form of treatment. However, on reviewing these cases, it was found two were in ectopic sites where excision was complete. One case had an adequate excision according to modern surgical principles, with exposure of the facial nerve. Four tumours were

TABLE V

BENIGN MIXED SALIVARY TUMOURS IN 13 PREVIOUSLY TREATED PATIENTS ADMITTED MORE THAN 5 YEARS AGO

Type of treatment	*No.*	*Results*
Local excision only	3	1 well at 6 years 1 recurrent at 5 years (died intercurrent 6 years) 1 recurrent at 4 years, alive with recurrence at 9 years
Local excision and radiation	8	8 well at 5 years, or longer. None have had recurrence
Radiation only	2	1 well at 20 years 1 died with recurrence at 1 year
TOTAL	13	10 free of tumour at present time 1 died with recurrence at 1 year 1 died with recurrence at 6 years 1 alive with recurrence at 9 years

All patients had recurrent tumours on admission.

small and, although enucleated, were evidently completely removed. One case occupied the lower pole of the superficial lobe, hanging down like a teardrop so that it was completely removed without having to disturb the facial nerve. Two cases arose from the deep lobe of the parotid gland and presented in the mouth, and were removed by that route, presumably completely. Therefore, these 10 cases cannot be regarded as typically located parotid tumours.

Recurrence rates from the literature. Table VI sets out a series of recurrence rates derived from the literature. It will be seen the overall recurrence rate of 6 per cent. reported in this series compares more than favourably with that in other series. The reason for this low recurrence rate cannot be explained by the nature of the surgery performed because no particular type of operation was routinely used. The operations were performed by a wide variety of surgeons and in many instances enucleation only was done. In some instances only an excisional biopsy was used. In few cases only was the facial nerve exposed as recommended by Janes. Therefore, this is just the type of surgery which should produce a high recurrence rate.

There are two possible explanations for this low recurrence rate. The first is that the five-year yardstick is not long enough. This is possible, but it is to be noted that most recurrences occur within this five-year limit.

TABLE VI

QUOTED RECURRENCE RATES FOR BENIGN MIXED PAROTID TUMOURS

	Year	*Per cent. Recurrence*
Sistrunk	1921	18.3
Stein and Geschickter ...	1934	20.0
McFarland	1936	34.2
Marshall and Miles ...	1947	15.0
Rawson, Howard, Royster and Horn	1950	31.0
Benedict and Meigs ...	1930	42.5
Jerome	1954	14.5
Ahlbom	1935	9.0
Smiddy	1956	30.0
Eddey	1957	nil
Janes	1957	6.0

The second reason is that in this series full heavy adequate irradiation has been added to the surgical treatment in the majority of the cases.

Radiation therapy. It must be stressed that this radiation must be adequate. One course of treatment is given, using the 200 to 400 kilovolt X-rays or radioactive cobalt source. The dose was 4,500 to 5,000 roentgens in about 20 days or 5,500 to 6,000 roentgens in 32 days. A single field adequate to cover the area of the tumour was used. It varied from 5 × 5 cm. to 10 × 10 cm. In a few earlier cases radium implant was used. It must further be stressed that no permanent disability resulted from this heavy irradiation. The patients would develop temporary symptoms of mucositis, dry mouth, loss of taste and sometimes some dysphagia. Skin erythema was usual when X-rays were used, but was not marked with cobalt therapy. These symptoms were all transitory. In the experimental irradiation on the rats' parotid gland, it was found doses between 4,000 to 5,000 roentgens were required to produce appreciable effects of fibrosis and atrophy.

It is hard to produce concrete evidence of the beneficial effects of irradiation on pleomorphic adenomas other than the low recurrence rate quoted, but Table VII would suggest such evidence.

TABLE VII

EXAMPLES OF EFFECT OF RADIATION ALONE ON BENIGN MIXED TUMOURS

1.	1169	Recurrent Case	Treated with X-ray and radon seeds. Necrosis occurred but healed spontaneously and well twenty years later.
2.	19336	Recurrent after three excisions	Treated Co^{60} 5500 r in 20 days. Well 4 years later.

Malignant tumours. The beneficial effect of irradiation is more convincing in the review of the malignant salivary tumours. Table VIII sets out the distribution and pathological types of these tumours. It will be seen that there were 44 such tumours and 10 of these were in the submandibular gland. The submandibular tumours are interesting as they

TABLE VIII

MALIGNANT SALIVARY TUMOURS

	Parotid	*Submaxillary*	*Sublingual*	*Ectopic*	*Total*
Malignant mixed	12	5			17
Muco-epidermoid carcinoma	5				5
Squamous cell carcinoma	6				6
Adenocarcinoma	10	5		1	16
TOTAL	33	10		1	44

would appear to have a sinister prognosis. Six of the patients with submandibular tumours are dead of recurrence from metastases. One is alive with recurrence and the remaining three are too recent to discuss. Tables IX and X set out the survival figures of 31 malignant cases treated

TABLE IX

FIVE-YEAR SURVIVAL IN CASES OF MALIGNANT TUMOURS OF THE SALIVARY GLANDS

Type	*Total No.* 1932 *to* 1955	*No. treated over 5 years ago**	*No. of 5-year survivors*	*Per cent. 5-year survivors*
Malignant mixed	17†	11†	9†	82
Adenocarcinoma	14†	10†	4	40
Muco-epidermoid	5†	4†	3†	75
Squamous cell	6†	4†	3†	75
Unspecified carcinoma	2†	2‡	1†	50
All cases	44	31	20	65

* Date taken from admission to Clinic or Clinic treatment, whichever was later.
† Unchecked slides in 1 of these cases.
‡ Unchecked slides in 2 of these cases.
It should be noted that these figures include previously treated patients admitted to the Clinic. See Table XII for previously untreated cases.

five years or more ago. It will be noted that the overall five-year survival figure is 65 per cent. for all such cases and 71 per cent. in the primary cases. It is further to be noted that all the primary malignant mixed parotid tumours survived five years. These figures compare more than favourably with figures of Ariel, Jerome and Pack of 32.5 per cent. clear of disease at the end of five years (1954).

The pathological classification is that according to Foote and Frazell of the New York Memorial Center for Cancer and Allied Diseases (1954). It is stressed that careful pathological diagnosis of each tumour should be made. There is a tendency to divide all parotid tumours into a classification, either benign or malignant, and not to distinguish between the malignant mixed tumours and the carcinomata. Furthermore, the

TABLE X

FIVE-YEAR SURVIVAL IN CASES OF MALIGNANT TUMOURS OF THE SALIVARY GLANDS PREVIOUSLY UNTREATED

Type	*No.*	*No. surviving 5 years after treatment*	*Per cent. 5 year survivors*
Malignant mixed	9	9	100
Adenocarcinoma	7	3	43
Muco-epidermoid	3	2	66
Squamous cell	4	3	75
Unclassified carcinoma	1	0	0
TOTAL	24	17	71

" Previously untreated " cases include those patients who, before coming to the Clinic, have had a biopsy only, or who, within 6 weeks of being admitted to the Clinic, have had a surgical excision which has been followed immediately by radiation treatment in the Clinic.

carcinomata should be divided into adenocarcinoma, muco-epidermoid carcinoma and squamous cell carcinoma because of the differing prognosis in these three types. It will be noted from Tables IX and X that the malignant mixed parotid tumours have a far better prognosis than frank carcinomata, and therefore a more conservative form of surgical excision can be used on them with confidence.

The treatment of these malignant lesions was a combination of surgical excision, and heavy irradiation in all the cases except six. The irradiation technique was similar to that for the benign tumours only heavier dosage was used, 4,500 to 5,500 roentgens were given over 21 days or 5,000 to 7,000 roentgens over 32 days. Table XI sets out eight examples of malignant neoplasms which responded well to radiation. It would appear that these eight tumours have been destroyed by the irradiation.

It would appear, therefore, that surgery plus irradiation will produce better results than surgery alone, not only in malignant salivary tumours, but also in the pleomorphic adenomas. The beneficial effect of the irradiation might act in one of three ways:

(1) It could kill any neoplastic cells which have been spilt in the course of the operation.
(2) It could kill any small clumps or nodules of tumour left behind at the site of the excision.
(3) It might destroy the remaining salivary gland and so produce a total parotidectomy by irradiation.

TABLE XI

EVIDENCE OF EFFECTIVENESS OF RADIATION IN MALIGNANT PAROTID TUMOURS

	Treatment	*Result*
Malignant mixed		
6693	Treated 400 Kv., 6,000 r in 32 days	Well 10 years
7506	Incomplete excision. Treated 200 Kv. 7 cm. diameter circular field; 5,300 r in 17 days	Well 8 years
17414	Recurrent after local excision, 5 months prior to coming to the clinic. Treated Co^{60}, 10 cm. × 8 cm.; 5,000 r in 22 days	Well 2½ years Died intercurrent disease 2½ years
15483	Incomplete excision followed by 8 cm. diameter circular field; 200 Kv., 5,000 r in 18 days	Well 5 years
Adenocarcinoma		
8693	400 Kv., 10 cm. × 10 cm. field; 5,000 r in 21 days	Well 1 year Died 1 year Intercurrent disease
Muco-epidermoid		
16921	Incomplete excision 6 weeks prior to Co^{60} 10 cm. × 6 cm. field; 5,000 r in 20 days	Well 5 years
Squamous cell		
21305	Radiation only; 200 Kv., 12 cm. × 8 cm. field; 5,500 r in 33 days	Well 2½ years
11623	Radiation only; Co^{60} 7 cm. × 5 cm. field; 7,000 r in 27 days	Well 2½ years

Evidence of the effectiveness of radiation is hard to get, as most cases were treated by post-operative radiation immediately after local excision and, of course, there is no way of knowing whether the latter was complete or not. The cases mentioned above, however, seem to indicate unequivocally that radiation alone can be curative in some cases of cancer of the salivary glands.

Probably all three factors may operate. The experimental investigation, previously mentioned, would suggest that item (3) is certainly operative. But it should be stressed that this is no apologia for inadequate surgery, and to try and cover this up by irradiation. But rather it is urged that adequate surgery should be performed and this should be followed by full adequate heavy irradiation.

Appendix

It is now pertinent to consider what is meant by adequate surgery. The classical parotid tumour is the pleomorphic adenoma and the surgical technique to be described will deal with such a tumour. The tumour is usually situated in the superficial portion of the gland overlying the angle of the mandible. It may, however, present behind the lobe of the ear, or may arise in the deep lobe of the gland and present in the mouth in the region of the anterior pillar of the fauces (Fig. 1).

As the tumour grows it will eventually involve the whole of the superficial lobe, but it is noticeable that, when small, there is a marked tendency

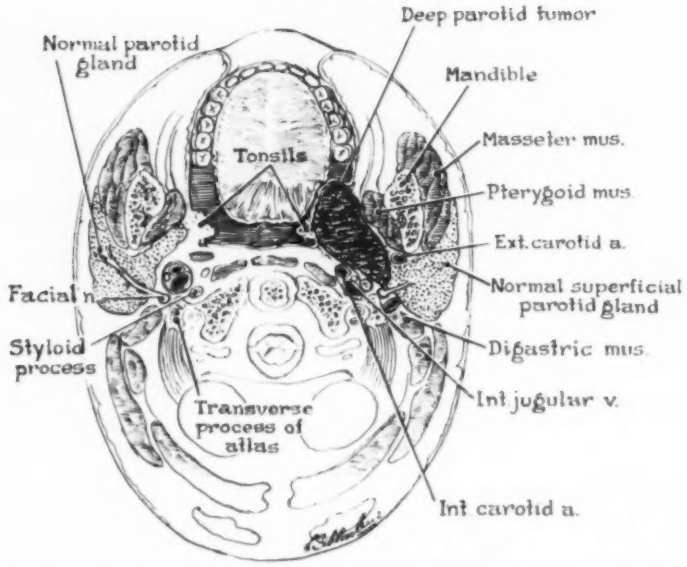

Fig. 1. Cross section of parotid region showing a parotid tumour arising from the deep lobe of the parotid gland, and presenting in the oral pharynx.

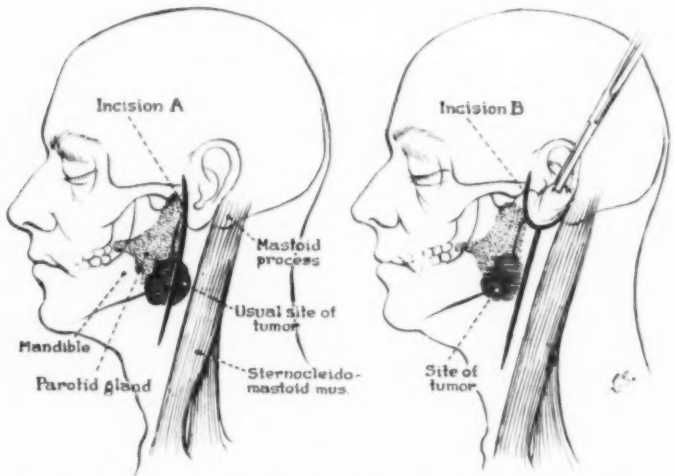

Fig. 2. (*a*) Usual site of parotid tumours with frequently used incision. (*b*) The incision for parotid tumours recommended by Hamilton Bailey.

for it to occupy the lower and posterior aspect of the superficial lobe of the gland (Fig. 2 (*a*) and (*b*)).

General anaesthesia with intratracheal intubation is used. It is of great advantage to add to this the use of a rapid-acting hypotensive agent such as " Arfonad ", and to posture the patient with the head elevated about 15°. This will help to give an almost bloodless field. The use of the neurosurgical head rest (Fig. 3) is an added help, as it permits firm positioning of the head and convenient application of the drapes. The correct draping of the patient is important. The anterior towel is so placed that the outer canthus of the eye and the angle of the mouth are left exposed, so that any movements of the facial muscles can be seen when the facial nerve is stimulated. These drapes are stuck to the skin with " mastasol " or " collodium ", or some such preparation.

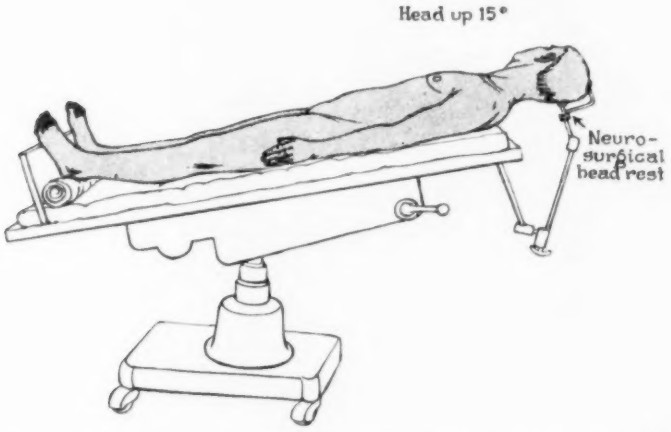

Fig. 3. Position for operations on the parotid salivary gland, using the neurosurgical head rest.

Various skin incisions have been advocated (Fig. 2 (*a*)), but that suggested by Hamilton Bailey (Fig. 2 (*b*)) has been found satisfactory in so far as it gives excellent exposure, heals well and leaves no disfigurement. The whole plan of the incision is to give early access to the main branch of the facial nerve. The **U** part of the incision passes immediately around the lobe of the ear, and anteriorly should be as close to the tragus as possible. By placing tissue holding forceps on the lobe, this part of the ear may be drawn upwards and backwards to give excellent exposure of the outer surface of the cartilaginous portion of the external auditory canal. The vertical portion of the incision extends downwards just in front of the anterior border of the sterno-mastoid muscle. The skin and

platysma muscle are reflected backward over the mastoid process and forward off the posterior part of the parotid gland. It is a good practice to isolate the external carotid artery and either ligate it or apply a bulldog clamp to it, just below the origin of the facial artery (Fig. 4). Some surgeons claim that this is unnecessary, but it does help to render the field less bloody, and has no known disadvantage. External carotid artery occlusion plus hypotension and posturing gives a remarkably bloodless field, which is of great advantage in this vascular area.

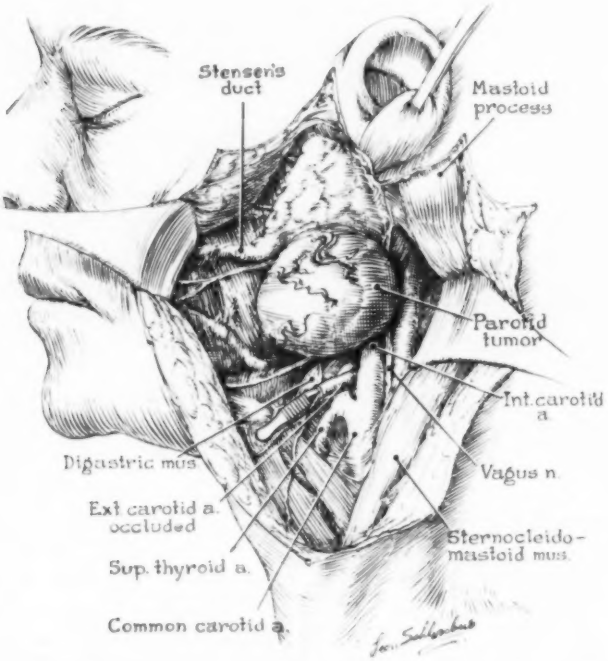

Fig. 4. Typical parotid tumour showing extent of superficial dissection required. The site of occlusion of external carotid artery is shown.

Certain bony landmarks should now be defined. The mastoid process is readily identified. Some surgeons advocate the chiselling off of the mastoid process, but this is rarely necessary. Immediately below the mastoid process and somewhat in front of it, the transverse process of the atlas can be felt. This is important because it defines the plane of separation of the parotid gland from the contents of the retrostyloid space.

In front of and above this landmark, and much deeper, can be felt the styloid process, and above this is the tympanic plate of the temporal bone. This latter landmark is vital because the main trunk of the facial nerve emerges from the stylomastoid foramen behind and lateral to the bony plate. Furthermore, the styloid process may be absent, but this tympanic plate is always present. It therefore gives the depth at which the facial nerve may be encountered. These bony landmarks should be palpated by the index finger. The lower pole of the parotid gland is then dissected free from the anterior border of sternomastoid muscle to which it is

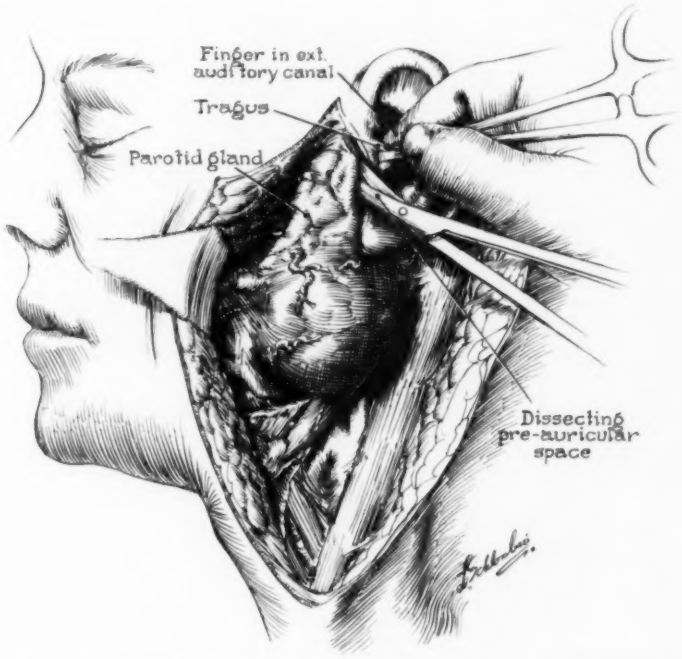

Fig. 5. Showing the development of the pre-auricular fascial plane by blunt scissor dissection immediately anterior to the cartilaginous external auditory canal.

attached by a band of fascia. The plane between the posterior aspect of the parotid gland and the front of the cartilaginous portion of the external auditory canal is now developed. This plane is most readily found by passing the index finger into the external auditory canal and at the same time pulling up on tissue forceps placed on the tragus. Then the plane may be opened up by blunt dissection with dissecting scissors (Fig. 5).

The index finger enables the operator to feel the points of the dissecting scissors in front of the canal and therefore enables him to define the plane correctly. This plane consists of loose areolar tissue and, when followed, comes right down to the main trunk of the facial nerve. This is shown by inserting two small retractors into the space opened up, and pulling the posterior border of the parotid gland forwards (Fig. 6). The facial nerve

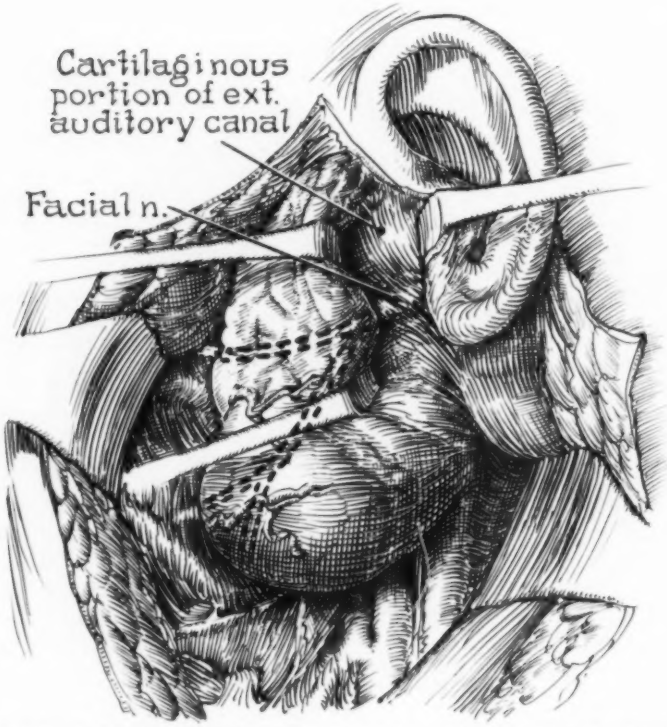

Fig. 6. Showing the pre-auricular plane opened up and the area of the facial nerve displayed in the depths.

will then be felt as a taut cord passing forwards from behind the tympanic plate. At first it is better felt than seen. It passes downwards laterally and forwards from the plane of the styloid process. If in doubt of its location, an electric stimulator may be useful to define its whereabouts. It is usually overlain by a thin band of rather tough fascia which has to be gently dissected aside before it comes clearly into view (Fig. 6).

Once the main branch of the facial nerve has been defined the superficial lobe of the parotid gland is dissected off by keeping just superficial to the plane of the nerve and its branches, using dissecting scissors to open up the plane. If any doubt exists about the branches of the nerve, they may be resolved by a nerve stimulator and observing the action of the facial muscles. The dissection of the gland is continued forward until the

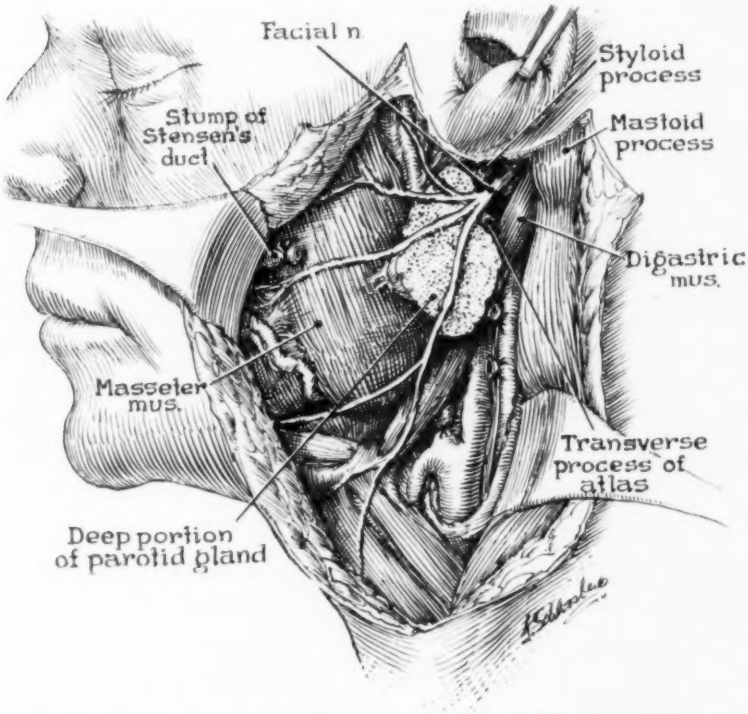

Fig. 7. Operative field after adequate removal of superficial benign parotid tumour. The facial nerve is seen to come forwards, downwards and outwards from the lateral aspect of the styloid process.

anterior border is reached. Stensen's duct may be ligated and divided or left *in situ* as is indicated by the extent of the dissection required to remove all that part of the gland containing the tumour. This, of course, will leave the small deep portion of the gland in the retromandibular position (Fig. 7). This will not cause fistula formation, possibly because its secretory nerve supply has been destroyed by the destruction of the auriculo-temporal nerve.

The specimen, consisting of the superficial lobe of the parotid gland, plus tumour, should now be given to the pathologist and a frozen section done. This will indicate whether frank malignancy exists. If any doubt exists, the results of the permanent paraffin sections should be awaited. Should frank malignancy be found, the deep portion of the gland should also be removed by extracting it from the plane deep to the facial nerve, by morcellation if necessary. Should any branch of the facial nerve be involved in malignant tissue and that branch is inactive, as shown by stimulation, then it should be sacrificed. However, if the branch is still active, then it should be dissected free from the malignant tissue and preserved. Heavy irradiation will then be given post-operatively. The presence of malignancy does not presuppose the necessity of sacrificing the whole facial nerve. The malar branch in particular should be preserved at all costs to preserve the action of orbicularis oculis muscle to protect the cornea of the eye. This plan of preserving the facial nerve particularly applies to malignant mixed parotid tumours because of their excellent prognosis with surgery plus irradiation. The wound is now washed out well with normal saline or perchloride of mercury 1/1,000 to wash away any tumour cells knocked off into the wound during the dissection. The skin is then closed with interrupted fine sutures and a Penrose drain is left in the lower part of the wound for 48 hours and a pressure dressing applied.

It is suggested that all tumours of the parotid gland should be removed by this method of radical anatomical surgery. The facial nerve should always be displayed in order to be sure of removing an adequate area of parotid gland from around the tumour. This should then be followed up by full heavy irradiation.

PART II

AN EXPERIMENTAL STUDY OF THE EFFECTS OF IRRADIATION UPON THE PAROTID GLAND*

In 1958, McEachen, Moore, Nanson and Watson reported the results of surgery plus irradiation of salivary tumours seen at the Saskatoon Cancer Clinic over the previous 25 years. In this Clinic, it is the practice to treat all these salivary tumours, whether benign or malignant, by surgical excision followed by irradiation. The results of this combined form of treatment produced good results, even though the surgery in many instances had been inadequate in extent. They recorded an overall five-year recurrence rate of only 6 per cent. for benign mixed salivary tumours, and a 65 per cent. five-year survival rate for malignant salivary tumours. These figures were comparable to any recorded series in the literature, where wide

* This work was carried out in the Departments of Surgery and Radiotherapy of the University of Saskatchewan, in collaboration with J. G. Noble, M.D., Research Fellow in Surgery, and T. A. Watson, M.B., Ch.B.(N.Z.), D.M.R., Professor of Therapeutic Radiology.

and complete surgical excision had been carried out. They therefore deduced that irradiation had played a significant role in helping the control of these tumours when used in conjunction with surgery.

It was suggested that perhaps irradiation destroyed any small foci of residual tumour, or killed any neoplastic cells spilled in the wound, or alternatively produced a total parotidectomy by destroying the residual gland. When the authors studied the literature to find out the effects of irradiation on the parotid gland, it was discovered that there had been little experimental work done in this field.

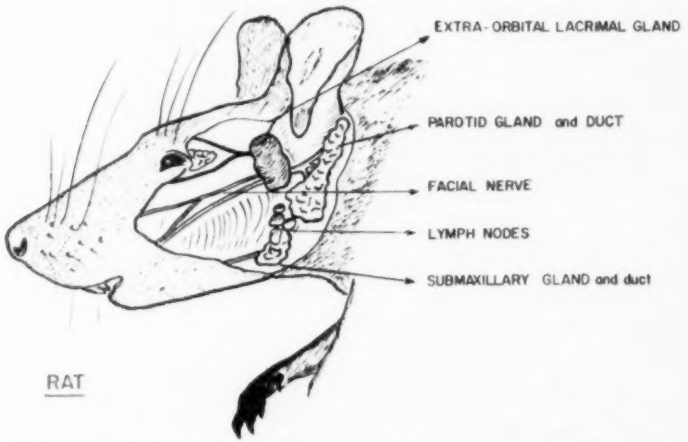

Fig. 8. Dissection of the head of a Whistar rat to demonstrate the anatomical sites and relations of the salivary glands.

In 1955, English reported the effect of 1,000 to 1,500 roentgens using a 200 Kv. source, on the submaxillary glands of the rat. He followed the rats for 16 hours to 100 days. He noticed certain changes in the size, shape and staining characteristics of the acini cells: but, in this experiment, he used whole head irradiation, the dose was small, and he followed the animals for only a short time. Furthermore, the controls were inadequate. In 1955, English, Wheatcroft, Lyon and Miller reported a further series of total head irradiation—this time in six dogs, which were sacrificed over the next five to sixteen months. In spite of the low dosage used, they reported marked reduction in the size of the salivary glands, especially the parotid glands. However, again the controls were inadequate. Therefore, it was decided to study the problem in rats using heavy irradiation from 4,000 to 8,000 roentgens, and limit the radiation to the parotid glands, rather than irradiate the whole head.

The method

Thirty white male Whistar rats of an average weight of 350 gms. were used throughout the experiment. It was planned to deliver 4,000 to 8,000 roentgens of irradiation to the right parotid gland in fifteen sessions, five sessions being given each week. It was not found possible to devise a suitable restraining device to hold the rats still during the irradiation, and therefore ethyl ether anaesthesia was administered to the rats prior to each radiation treatment.

The source of irradiation was a General Electric KX 10 X-ray machine, the factors being 140 Kv., 5 MA, F.S.D. 15 cm., and a HVL of 3.25 aluminium. A circular field 1.5 cm. in diameter was found adequate to cover the surface marking of the parotid gland of the rat, provided the tube was correctly located. In order to determine the exact surface marking of the parotid gland, several rats were dissected (Fig. 8). The parotid gland was found to be constantly located at the base of the pinna, and consequently the tube was placed over this area each time (Fig. 9).

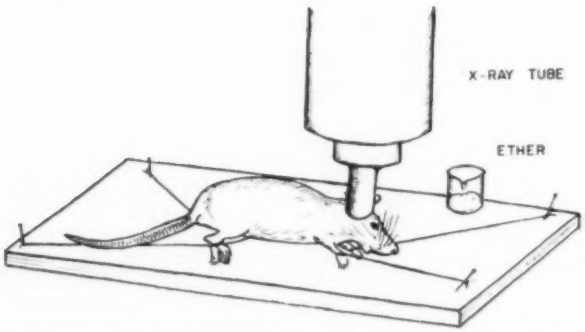

Fig. 9. Diagram of the technique of irradiating the parotid gland of a rat.

Measurements of the head of the rat showed that the left parotid gland lay at approximately 2 cm. from the right parotid gland, and would therefore receive a calculated 47 per cent. of the dose received by the right side. Therefore, by studying both right and left glands in each animal, two dosage levels could be obtained for the parotid tissue in each animal.

Two control groups of five rats each were set up. The first group was neither anaesthetized nor irradiated. The second group was anaesthetized fifteen times, but was not irradiated. Then four further groups of five rats each were set up. Group I was given 4,000 roentgens over fifteen treatments. Group II was given 5,000 roentgens. Group III 6,500 roentgens and Group IV 8,000 roentgens, all spread over fifteen sessions.

All of the rats, thirty in all, were kept under identical conditions of housing and feeding until they were sacrificed. They were fed on calf-meal pellets and water.

After a period of two months following the completion of the irradiation, two rats from each of the control and irradiated groups were sacrificed by an overdose of ether. One further rat from each group was sacrificed at six months and another at twelve months. At the time of sacrifice a note was made of any evidence of epilation or of mucosal damage to the mouth and pharynx. The parotid glands were immediately dissected out and, after weighing, were fixed in formalin. They were later mounted in paraffin wax, sectioned, and stained with haemotoxylin and eosin for histological examination.

Two rats died before their due date of sacrifice. One rat, given 4,000 roentgens, died at six months after a brief illness characterized by sluggishness and anorexia. A further rat from this same group died ten months after irradiation. It bled per rectum and appeared sluggish for some days prior to death. These two deaths were not thought to be due in any way to the irradiation, but to some general disease.

The histological examination of the parotid gland sections was performed by two pathologists* working independently. They were unaware at the time of studying the sections what dosage of irradiation had been given in any particular instance. The tissue changes looked for were atrophy, fibrosis, chronic inflammation and vascular proliferation. The cytoplasm was studied for evidence of swelling and vacuolation. The nuclear changes noted were swelling, gigantism, plurality, hyperchromatism, pyknosis, karyhorrhexis and vacuolation. Tables were then drawn up evaluating these various criteria on a minus, one plus, two plus and three plus scoring table. The results were finally compared with each other and a composite table arrived at. This was then compared with the dose of irradiation and the duration of time before sacrifice. The interesting feature of this table was the close agreement of the two pathologists in their assessment of each slide.

The results

With the exceptions noted previously, all the animals survived, some up to twelve months following irradiation. One rat which received 8,000 roentgens is still alive after an interval of fourteen months. The animals all looked well and behaved normally.

Temporary epilation was seen over the 1.5 cm. irradiated area in all the rats except in those receiving only 4,000 roentgens. This epilation began three to four weeks after the irradiation was completed. The bald area

*Dr. D. F. Moore and Dr. H. E. Emson.

was useful in proving that the irradiation had been accurately delivered because in each instance it measured 1.5 cm. in diameter. No fur loss was seen on the opposite side of the head. The fur grew again after a few weeks' interval in all except the 8,000 roentgens series of rats. In this latter group thin atrophic skin with telangiectatic vessels was seen. Damage to mucous membranes of the mouth and pharynx was conspicuously absent in all the rats.

The changes noted in the parotid glands were then studied. In those animals sacrificed two months after irradiation the right parotid gland, i.e. the one to which the irradiation was primarily directed, was found to be reduced in size by approximately one-third compared with the controls. They also appeared indurated on gross examination. The control glands on the other hand appeared grossly normal. No weights were determined on these two-month glands so that the exact reduction in mass was not recorded. The histology, on the other hand, showed such a wide range of variation, both in the control and the irradiated glands, that no deductions could be drawn when the survival time was as short as two months.

On the other hand in those animals sacrificed six months after irradiation, a further marked reduction in size of the parotid glands was evident. These parotid glands were weighed and compared with the controls. These weights are recorded in milligrams in Table XII. It will be seen that

TABLE XII

WEIGHTS OF PAROTID GLANDS

	6 months after irradiation		*12 months after irradiation*	
	Right	*Left*	*Right*	*Left*
Group I 4,000 r	110 mgms.	137 mgms.	35 mgms.*	80 mgms.
Group II 5,000 r	52 mgms.	90 mgms.	32 mgms.	95 mgms.
Group III 6,500 r	42 mgms.	72 mgms.	26 mgms.	75 mgms.
Group IV 8,000 r	20 mgms.	38 mgms.	10 mgms.	65 mgms.
Group V Controls	125 mgms.	128 mgms.	128 mgms.	124 mgms.

* This rat died 11 months after completion of the irradiation.

the maximally irradiated right gland receiving 8,000 roentgens was reduced in mass to one-sixth of the controls, whilst the left gland, which received approximately 50 per cent. of the dose of the right gland, was

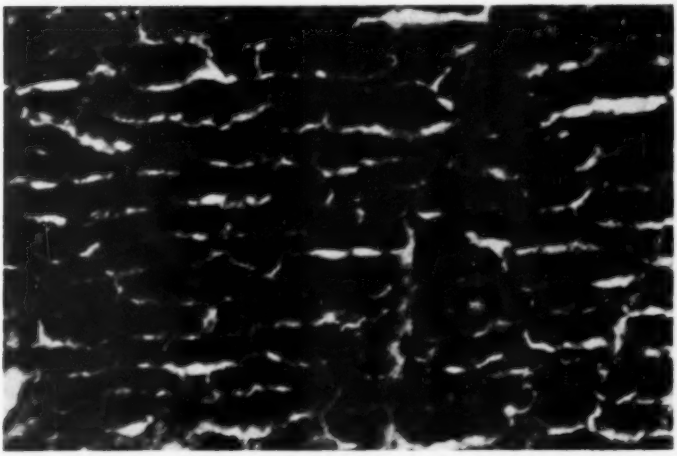

Fig. 10. Microscopic appearance under high power of the parotid gland of a normal control rat.

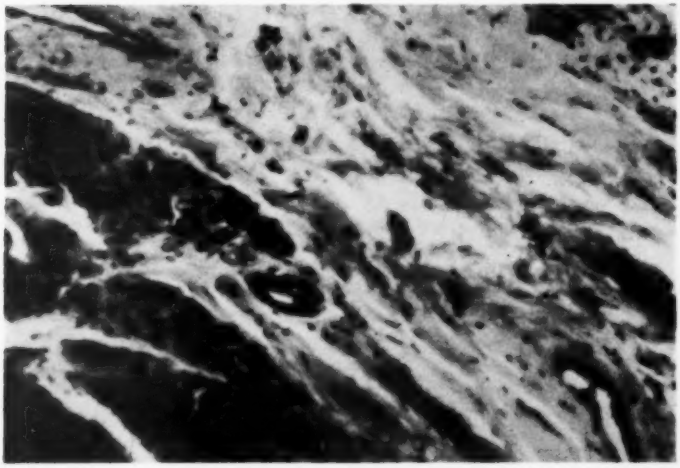

Fig. 11. Microscopic appearance under high power of the parotid gland of a rat sacrificed twelve months after irradiation with 8,000 roentgens. Note the marked fibrosis and absence of any normal acini.

reduced by over one-third. Significant differences were also recorded on histological examination in all the parotid glands save the 4,000 roentgens series at this time.

In the animals sacrificed at an interval of twelve months after irradiation, the parotid glands on the right or irradiated side were minute in size. The weights of the glands are also recorded in Table XII. These glands were markedly sclerotic as were the surrounding tissues. Microscopic examination showed that the fibrosis was intense (Figs. 10 and 11). Thus these minute glands consisted largely of dense scar tissue, and no normal acini were seen. It may therefore be inferred that, as functioning glands, they had ceased to exist.

In studying Table XII, it will be seen that there is a progressive loss of weight in the right parotid glands as the dosage of irradiation is increased from 4,000 roentgens to 8,000 roentgens. In the six-month series, the most marked reduction is seen in the 5,000 roentgen to 8,000 roentgen groups. In the twelve-month series the marked change is in the 6,500 and 8,000 roentgen groups. The left glands can be assumed to have received approximately 2,000, 2,500, 3,250 and 4,000 roentgens, and their weights are correspondingly reduced, but the left gland in Group IV, which theoretically received the same dose as the right gland in Group I, is not reduced to the same extent either in the six-month or the twelve-month group. The reason for this difference is not exactly clear.

SUMMARY AND CONCLUSIONS

I. X-ray irradiation of the parotid gland of the rat is described in dosages varying from 4,000 to 8,000 roentgens, delivered in 15 treatments over a three-week period.

II. The animal is able to survive large doses of irradiation up to 8,000 roentgens for periods up to one year.

III. Significant diminution in the bulk and weight of the irradiated glands is seen, especially when the survival time is six months or longer.

IV. Significant histological changes are seen as the result of the irradiation.

V. It appears reasonable to assume that such parotid glands are, for all practical purposes, destroyed by intense local irradiation.

ACKNOWLEDGMENTS

I wish to express my thanks to my colleagues, Dr. T. A. Watson, Director of the Saskatoon Cancer Clinic and Professor of Therapeutic Radiology, University of Saskatchewan; Dr. D. F. Moore, Professor of Pathology, University of Saskatchewan, and Dr. D. G. McEachen, my then

Surgical Fellow in Pathology, who accorded me the privilege of presenting the statistical survey recorded in the first half of this lecture; and to Dr. D. F. Moore and Dr. H. E. Emson, Lecturer in Pathology, University of Saskatchewan, who kindly examined the histological sections, and to the technicians of the Saskatoon Cancer Clinic, who administered the irradiation in the experimental study recorded in the second half of the lecture.

I also wish to thank the Editors of *Surgery, Gynecology and Obstetrics*, for permission to reproduce Tables I–XI.

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RUSCOE CLARKE MEMORIAL LECTURE

We have been asked to notify the readers of the *Annals* that the Inaugural Ruscoe Clarke Memorial Lecture on "The Care of the Injured," to be delivered by Lt.-Gen. Sir Alexander Drummond, K.B.E., C.B., F.R.C.S., will be held on 25th April, 1960, at 5.30 p.m., in The Large Lecture Theatre, Department of Anatomy, of the University of Birmingham.

Tickets for admission may be obtained from the Secretary, Institute of Accident Surgery, Birmingham Accident Hospital, Bath Row, Birmingham 15.

THE MOYNIHAN CHIRURGICAL CLUB (1909–1959)

Jubilee Meeting at Leeds : 24th and 25th September 1959

THE MOYNIHAN CHIRURGICAL CLUB, founded by Mr. Berkeley G. A. Moynihan, later Lord Moynihan of Leeds, on 24th July 1909, celebrated its golden jubilee on 24th and 25th September 1959. The President for this meeting was Professor Digby Chamberlain, who had been Lord Moynihan's student, his house surgeon and for eleven years his private assistant.

The Lord Mayor of Leeds, Alderman Mrs. G. A. Stevenson, J.P., and Lady Mayoress, her daughter-in-law, Mrs. Derek A. Stevenson, gave a Civic Reception to the members of the Club at the Civic Centre on the evening of Friday, 25th September.

The banquet was attended by the members and one hundred and fifty guests. The Lord Mayor welcomed the Club, saying how much she and her colleagues appreciated the fact that the Club had chosen Leeds as the venue for its jubilee meeting. She referred to all that the first Lord Moynihan had done for the promotion of the science and art of surgery, not only by maintaining and enhancing the surgical tradition of the Medical Faculty of the University of Leeds, but also his influence on its development throughout the English-speaking world and elsewhere.

The toast to the memory of the late Lord Moynihan was proposed by Professor Digby Chamberlain and Mr. George Armitage, who had also been one of his students and his house surgeon, also by Dr. Alton Ochsner of New Orleans, a past president of The American College of Surgeons. The present Lord Moynihan replied and referred to many incidents which he vividly remembered illustrating his father's devotion to the ideal, in the realization of which he was so loyally supported by the speaker's mother, of blending the surgeons of Great Britain and Ireland into a band of brothers united by the bonds of friendship and mutual respect.

The local committee had provided a surgical programme such as would have appealed to the founder. Each member of the Club was presented with a group photograph of those surgeons who attended and took part in the first meeting held in Leeds on 23rd and 24th July 1909.

The background

Berkeley George Andrew Moynihan, the third child and only son of Captain Andrew Moynihan, V.C., was born in Malta on 2nd October 1865. He died at his home, Carr Manor, Meanwood, Leeds, on 7th September 1936, six days after the death of his wife, whose funeral he had attended on 3rd September.

Lord Moynihan

He had always wished to be a soldier and thereby follow in the footsteps of several generations of his forebears. This decision was a source of great grief to his mother, who, by the death of his father from Malta fever on 19th May 1867, had been left with three children, whom she had to maintain and educate with the help of an Army pension of one pound a week. She with her family had returned to Leeds, where a married sister lived. Berkeley attended a dame's school in Leeds at which one of his schoolfellows was J. B. Seaton, the future Bishop of Wakefield, who conducted Berkeley's funeral service in Leeds on 10th September 1936. Berkeley then went to Christ's Hospital (1875–1880) to which, being the son of a V.C., the Duke of Cambridge had given him a presentation. Later he went to the Royal Naval School (1880–1883) as he had an idea of joining the Royal Navy.

It was in 1883 that he overheard his mother telling one of his friends, who was to join the family at tea, how much she dreaded him joining the Army and that it was her greatest wish that he would be a doctor. During tea, he suddenly said to the family, " I am going to be the other thing ". In answer to his mother's question, " What do you mean? " he replied, " I am going to save life, not take it. As we were coming back from swimming we passed the Infirmary; we stood and looked at it a little while. It came on me all of a sudden that that was what I really wanted to do. The Moynihans have done enough of killing. It's time they mended their ways. I'm going to be the first to do it. I'm going to be a doctor." His intention then was to join the Army Medical Service. He entered the Yorkshire College in Leeds (later the University) as a medical student on 2nd October 1883, his eighteenth birthday. It can truly be said that his life then really began, as he had never been happy at school.

He was a model student and passed each examination at the first attempt. He qualified as a doctor in 1887 with the degrees of Bachelor of Medicine and of Surgery (M.B., B.S.) of the University of London and the Conjoint Diploma (L.R.C.P., M.R.C.S.) of the Royal College of Physicians of London and the Royal College of Surgeons of England.

He fulfilled resident medical officer appointments at the General Infirmary, Leeds, till 1889, and then made his first trip to surgical clinics in Europe, going to Berlin, then the Mecca of Surgery, to attend the surgical clinics of Professor Von Bergmann and of Professor Bardeleben. He returned to Leeds in 1890 and in April of that year was appointed as the Resident Surgical Officer at the General Infirmary; during this year he obtained the Diploma of Fellow of the Royal College of Surgeons of England and in 1893 the degree of Master of Surgery (M.S.) of the University of London, being awarded the gold medal.

He remained as the Resident Surgical Officer at the General Infirmary for three years (1890–1893), thereby gaining much experience in the tech-

niques of surgery and instructing his junior colleagues and the students who were fulfilling their appointments as surgical dressers. In 1894, he commenced practice as a surgeon, having rooms at 33 Park Square in the same house as one of his chiefs, Mr. Thomas Richard Jessop, who had engaged him as his private assistant and whose daughter, Isabel Wellesley, Berkeley married in 1895.

In 1896 he was appointed Honorary Assistant Surgeon at the General Infirmary, and full surgeon in 1906. He retired in 1926, having served on the senior staff for the full period of twenty years then allowed by the rules of the Hospital. When he joined the Honorary staff in 1896, the surgeons at the General Infirmary, as elsewhere, operated in their ordinary clothes covered by an apron; they wore no cap, mask, or sterilised rubber gloves. Moynihan introduced the fashion of wearing a sterilised white gown when operating. This innovation, with others he introduced later, caused a good deal of chaff from his colleagues and amusement for the students and nurses. At the Christmas festivities at the General Infirmary in 1904, a song was sung, poking fun at the " pyloric pierrot troupe " and what was later to become known as the " ritual " of a surgical operation. It reads thus —

" We see the surgeons turn aside, to test the latest germicide
To stop the wily microbe's latest infection,
They've sterile clothes from tip to toe, moustaches now have had to go,
And even just to speak will bring correction."

Then reference to the nurses:

" There's no doubt it must impress
To thus cover up each dress,
But I think it's cutting things too fine—Ah !
For quite soon they'll want to veil
Each face from gaze of male,
You'd be better far in convents out in China."

Moynihan soon commenced a habit which he followed for years of having " one paper in print, one in the press and one in preparation ". From 1900 onwards, papers on surgical subjects appeared under his name in medical journals published in this country, the U.S.A. and elsewhere. In 1901, with his old chief Mr. Mayo Robson, he wrote a book *Diseases of the Pancreas and their Surgical Treatment* and another *Diseases of the Stomach and their Surgical Treatment* was published in 1902 by the same firm (Messrs. W. B. Saunders, Philadelphia).

His enthusiasm for visiting surgical clinics in Europe and elsewhere which had commenced in 1889, when he visited those in Berlin, really dates from 1903. It arose in this way. During 1902 he had welcomed and entertained in Leeds several surgeons from the United States. One of them, Dr. Andrew Stewart Lobinger, of Los Angeles, was so impressed with Moynihan's methods and operative skill that, before returning home, he wrote to an American medical journal to say that during his trip to the

surgical clinics of Europe he had been most stimulated by the methods of Petersen working with Professor Czerny in Heidelberg, Lecène working with Professor Hartmann in Paris and Berkeley Moynihan in Leeds. As a result of this letter the American Association of Surgeons invited Moynihan to read a paper at the forthcoming meeting of the Association at Philadelphia in 1903. He was not quite 38 years old. The main event took place on 11th May 1903, in the Hall of the College of Physicians at Philadelphia. The agenda paper reads—

" Dr. W. J. Mayo of Rochester, Minnesota, will read a paper entitled ' A Review of 303 operations on the Stomach and first part of the Duodenum '. The paper will be discussed by Dr. Albert Van der Veer, Mr. B. G. A. Moynihan, Dr. John B. Murphy, Dr. J. M. T. Finney and Dr. Chalmers da Costa."

This paper gained for him the friendship of Drs. W. J. Mayo and John Benjamin Murphy. " About the approach to the mountain one may argue, but about the summit; never. It is there for all to see." Moynihan brought back with him a dozen pairs of rubber gloves, given to him by Halsted, who had introduced them into the Johns Hopkins Hospital in Baltimore; by careful use and repair they remained serviceable for a whole year.

After his return he wrote a book entitled *Gall Stones and their Surgical Treatment*, which was published in 1904. He continued visiting, as often as possible, surgical clinics in various places, thus making personal contacts with many surgeons. He noted anything different in their methods which appealed to him and later incorporated it into his own technique. He thus gradually developed what came to be known as the Moynihan technique; which it is no exaggeration to say has been almost universally adopted by surgeons in operating theatres all over the world. He inaugurated what may be regarded as a fellowship of surgeons. His book on Gall Stones met with the approval of the surgical world and established his position amongst surgeons in this country and elsewhere.

Over the years, Berkeley Moynihan focussed all his talents on the development of surgical techniques, firstly in his own hands and later in those of his colleagues. He introduced into British Surgery a perfection and delicacy of touch and a reverence for the tissues in the " Temple of the Body " which caused a French surgeon to exclaim when he saw it, " Is then your English blood so precious? "

He regarded surgeons as a band of brothers and was greatly concerned with the family honour, but above all he was ever striving for sound, humane and artistic surgery. He wrote:

" In every art and in all science the search is always for simplicity, and until you reach it you do not approach perfection. Ideals are not so much for capture as pursuit; if we fail to reach them as a profession, we can still continue ardent in the pursuit."

During 1903 to 1905 the early hours of each day, usually before breakfast, were devoted to the writing of his largest and, in the opinion of many, his greatest book entitled *Abdominal Operations*. It describes in the clearest and most lucid language his technique for performing those abdominal operations which are common to both sexes. The illustrations are as simple and perfect as art could make them. The text does not include any operative procedures on the kidney, bladder, or the various types of hernia. This book, published in 1906, literally threw open the abdomen to all surgeons and brought abdominal surgery within the grasp of those to whom it had previously been so obscure that its practice had been impossible. He had indeed blazed the trail and although in surgery he stands on a lower plane than his heroes, John Hunter and Joseph Lister, yet when reading it one realizes that their clasped hands rest on Moynihan's shoulder. He gave expression to this in his Hunterian Oration, at the Royal College of Surgeons of England on 14th February 1927, Lister's centenary year, when he took for his title " Hunter's ideals and Lister's practice ".

The formation of the Moynihan Chirurgical Club

Moynihan had seized the first opportunity to visit the surgical clinics in Berlin even before he had obtained the Fellowship of the Royal College of Surgeons of England or fulfilled the appointment of Resident Surgical Officer at the General Infirmary at Leeds. His real appreciation of all the advantages of visiting other medical centres must have resulted from his experience in Philadelphia in 1903 and on subsequent occasions. He fully realized the educational value and stimulus inherent in such visits which could not fail to provide an increase in experience for surgeons, with the resulting advantages for patients under their care. It must have been some such thoughts as these which prompted him to write the following letter to a number of provincial surgeons on 2nd July 1909.

It reads—

33 Park Square, Leeds.
2/7/1909

Dear

It has long been in my mind to suggest, to a few of the provincial hospital surgeons, the need for the formation of a small and informal " Society of Clinical Surgery ".

The object of this Society would be to hold meetings, say twice yearly of two days' duration at one of the hospitals as guests of one or more of the hospital staff. Operations could be performed, demonstrations on cases and specimens shewn and general conversation and discussion follow. Such meetings should ensure closer friendship amongst surgeons and make for better work.

I propose to ask a few men to Leeds on Friday and Saturday July 23rd and 24th for the purpose of discussing the whole matter. Harold Stiles, Alexis Thompson and Rutherford Morison, whom I have recently had with me here, are all in favour of this scheme.

I propose to arrange for operations on Friday morning and afternoon and a series of demonstrations on Saturday morning. It would give me great pleasure to hear that you will be able to come to Leeds for these two days.

Believe, me
Yours very truly,
B. G. A. MOYNIHAN.

The letter was sent to the following twenty-seven surgeons :

Messrs. Harold Stiles, Alexis Thompson and Professor Caird	(Edinburgh)
Messrs. J. H. Pringle, J. H. Nicholl and Farquhar Macrea	(Glasgow)
Messrs. J. H. Riddle and H. M. W. Gray	(Aberdeen)
Messrs. Robert Jones and Thewell Thomas	(Liverpool)
Messrs. W. Thorburn, Stanmore Bishop and Arthur Burgess	(Manchester)
Messrs. Rutherford Morison and Grey Turner	(Newcastle on Tyne)
Messrs. Gilbert Barling and Jordan Lloyd	(Birmingham)
Mr. C. H. Bond	(Leicester)
Mr. Sinclair White	(Sheffield)
Messrs. A. R. Anderson and Morley Willis	(Nottingham)
Mr. Lynn Thomas	(Cardiff)
Mr. C. P. Child	(Southsea)
Mr. Paul Bush	(Bristol)
Messrs. Walter Thompson and Joseph F. Dobson	(Leeds)
Mr. W. H. Jalland	(York)

All the recipients expressed themselves enthusiastically in favour of the formation of such a Society, and seventeen attended this first meeting.

On Friday, 23rd July, operations were performed in the General Infirmary by Mr. B. G. A. Moynihan and Mr. Walter Thompson.

On Saturday, 24th, demonstrations were given at the School of Medicine by—

(1) Dr. W. B. Coley of New York, who happened at the time to be the guest of Mr. Moynihan; he spoke on " The Treatment of Sarcoma with mixed Toxins ".

(2) Dr. J. K. Jamieson and Mr. Joseph F. Dobson on " Dissection of the Lymphatics of the Abdomen ".

(3) Dr. W. Maxwell Telling on " Specimens of Diverticula of the Large Intestine ".

(4) Professor Wardrop Griffith on " Some Anatomical Specimens ".

Leonard Braithwaite acted as the local Secretary.

On Saturday, 24th July, at 12 noon, an informal discussion was held on " the need for a Society of Clinical Surgery and the procedures to be adopted on its formation ".

It was unanimously agreed that " the need was urgent " so there and then such a Society was formed (24th July 1909).

Such then was the inception and formation of the Moynihan Chirurgical Club, which was always referred to by Berkeley Moynihan as one of the happiest inspirations of his life.

The second meeting was held in Edinburgh in 1910, with Professor F. M. Caird as President. The first foreign meeting was held in Paris in the spring of 1911, with Professor Alexis Thompson as President. The autumn meeting of 1911 was held in Manchester, with Professor William

Thorburn as President, where a constitution and set of rules were adopted for future guidance of the proceedings. Although it was the first Club to be founded in the country there was some difficulty in deciding upon a suitable name as a small number of surgeons practising in London had also formed a similar Club in 1910 and taken the name of " The Surgical Club ". It was decided, when the constitution and rules of the Club were adopted at the meeting in Manchester in 1911, that the first rule should read—

" *The Society shall be called the Chirurgical Club* "

In 1929, at the suggestion of Rutherford Morison and as a fitting compliment to the Founder who had been raised to the Peerage, the name was changed to be

" *The Moynihan Chirurgical Club* "

In acknowledging this compliment, Lord Moynihan wrote—

" I look back upon the formation of the Club as one of the happiest inspirations of my life. It seems to me that my ideal has been completely realised and that through the work of the Club, not only has the cause of surgery been advanced, but many warm friendships amongst surgeons have been created."

At the meeting at Hull in 1932, when Hey Groves was President, a matter was decided which had been discussed at several previous meetings, namely the desirability of adopting a suitable motto for the Club to be used on correspondence, programmes, menus, etc., in making arrangements for and during the meetings. It was decided that the Motto

" *Without Frontiers* "

expressed simply, directly and adequately the purpose and ideals of the Club. This motto also had the approval of Lord Moynihan. The Club was formed to foster the spirit of friendship and the knowledge of each other's work amongst provincial surgeons. It was the first step made to establish Moynihan's ideal of cooperation between British Surgeons and to place British Surgery in the front rank of the surgical world.

That the Club succeeded in realising Moynihan's ideals is supported by what Professor Grey Turner, an original member, wrote twenty-seven years after its inauguration. The following is the relevant quotation—

" Having had the advantage of knowing both worlds so to speak, that is, before there was any known means of bringing surgeons together and after, I can appreciate to the full the enormous benefit this Club has been to British Surgery and to Surgeons. By its means, many who might never have done so, have been induced to visit one another and to travel abroad and see work together; the benefit has been mutual and untold. It is a fitting tribute that the original Club should still exist, now under the founder's name, with undiminished activity and usefulness. There are many who think with me that the establishment of this Club and its nurture during the early years was really the best piece of work Moynihan achieved." (*B.M.J.* 1936 **II**, 653.)

Since the formation of the Club in 1909 its appeal has been such that other Clubs have been founded for surgeons and also for those who are practising the ancillary specialities. The number of active members of such clubs must necessarily be limited, so that the honour of being invited to become a member is regarded both as a great compliment and a privilege.

The British Journal of Surgery

Berkeley Moynihan had a further cherished idea and ideal for which the formation of the Moynihan Club was the essential preliminary. It was no less than that: "The surgeons of all England, Scotland and Ireland should be fused into a brotherhood."

The Chirurgical Club, hitherto limited to provincial surgeons, was now an accomplished fact, but his far seeing vision perceived the necessity to bring the provincial and metropolitan surgeons into closer communion; this was a far bigger and possibly a more difficult project.

Moynihan wrote:

"After long consideration, and after many talks with Hey Groves (Bristol), who was a constant inspiration and encouragement, I came to the conclusion that some bond must be made capable of holding us together before we were actually called to meet collectively, so Hey Groves and I decided upon a *British Journal of Surgery*, and I began to talk to and write to the leaders of our profession. I spoke to Rickman Godlee, Henry Morris, George Makins and others and wrote to MacEwen of Glasgow. Nowhere was there a sign of enthusiasm, and I received the coldest reception."

Professor Hey Groves has stated in the Moynihan Memorial Number of the *Leeds Medical Society Magazine* (March 1937)—

"The idea of the *British Journal of Surgery* arose in Bristol where there was a surgical book club, the aim of which was to take in at least one leading and representative surgical journal from each of the foreign countries. The question arose in discussion how a foreigner could choose a journal representative of British Surgery. It was discussed with Mr. Hartland Wright (the medical publisher). He told us of former efforts in this direction which had failed. He was keenly interested and suggested talks with the London surgeons. Messrs Wright and Sons, Ltd., had signified their willingness to undertake the financial risk of publishing the journal. We decided to try and get representatives of all the teaching hospitals on our editorial committee, and I was entrusted with the responsible task of inviting Mr. Moynihan to be the Chairman. The next incident stands out vividly. Although I knew his writings and had heard him speak at meetings, I had, up to that time (1912) never had any personal contact with him. He had recently been elected to the Council of the Royal College of Surgeons of England, and when I wrote asking for an interview, he asked me to meet him at the College. It was in the 'Examiners' room that I first shook him by the hand and it is in that very room that the great majority of our editorial meetings have taken place. He accepted our invitation and at once took steps to have our rules drawn up and our Committee elected.

He brought to the work not only his consummate skill and tact, but his peculiar and, at that time, unique knowledge of the surgeons and the surgical work of this country. Enquiry has also elicited the fact that previous failures of English surgical journals had been due to their having been too much 'one man shows' and also to their purely metropolitan setting. Moynihan having just founded the 'Chirurgical Club' was in close touch with the leading provincial surgeons and he suggested that we should secure

on the Editorial Committee a representative from each teaching school in Great Britain and Ireland. In this way a large committee was obtained, representative of London, the Provinces, Scottish and Irish Schools. Representatives were later co-opted from the teaching schools in the Commonwealth and Dominions. Moynihan presided over the Editorial Committee meetings from 1913 to 1936.

He was never late and never ruffled, and every member of the Committee felt that it was a pleasure and not a burden to do the work under his leadership."

No encouragement for the new journal was received from some of the best known surgeons in the country. One well known surgeon, of whom Moynihan had a very high opinion, wrote to say that " there was little British Surgery of any value and few men capable of writing anything worth while ". Moynihan, as Chairman of the newly formed Editorial Committee, then wrote to one of the colleagues of this surgeon asking if he would supply an article recording a visit to this particular surgeon's clinic for publication in the first number. This was done and a few days after its appearance Moynihan received a letter from the surgeon saying:

" If this is the kind of journal you had in mind I feel sure it will succeed."

Moynihan records his delight and satisfaction with this change of opinion.

The first number of the *British Journal of Surgery* was published in April 1913 and continued to appear quarterly throughout the war (1914–1918) and continued thus until 1951, when, owing to so many demands being made for publication of articles, the Committee, under the editorship of Sir Cecil Wakeley, Bt., decided to publish six numbers each year at an interval of two months and increase the size of the journal. By continuing publication during the military operations, articles on war surgery were obtained and also many contributors, readers, and subscribers from among the Belgian, French and American surgeons were also drawn into the Journal's circle. The Journal has prospered, as all British surgeons know, and all credit is due to the Committee who were responsible for it and above all to Ernest Hey Groves, the Editor. His place, while he was away for a year on war service, was taken by Sampson Handley, whose ardent labours for the journal were recognized by all.

The Association of Surgeons of Great Britain and Ireland

Moynihan wrote:

" When the Journal had made a start and seemed assured of success I inaugurated my last desire, namely the formation of an Association which should carry out on a large scale what my little Chirurgical Club has done on a small scale.

Sir Rickman Godlee was then President of the Royal College of Surgeons and I wrote him a letter making the suggestion that such an Association should be formed. He was tepid in his enthusiasm, cautious and sceptical. However, I urged him on and asked him to give a dinner to about twelve of us, myself, Watson Cheyne, Alfred Pearce Gould, George Makins, Hey Groves and others. We dined in Wimpole Street and after dinner I was asked to speak in the drawing room upstairs. I tried to put some inspiration into my words and was quite content with the reception I was cordially given. We decided there and then to form an Association, and I was asked to draw up a draft constitution,

This I did with the invaluable and devoted help of Hey Groves. Then the war came and for about four years nothing could be done; our interests had moved elsewhere. However, when the war was near its end I got to work again. Our draft constitution had meanwhile been completed and was awaiting a revival of interest when the war ceased. The draft constitution with hardly a word of change was accepted and the Association was formed ".

Although Berkeley Moynihan and Ernest Hey Groves were the actual instigators of the idea of the formation of the Association, it could not have been formed without the whole-hearted support of Sir Rickman Godlee, Bt. (P.R.C.S. 1911–1913), Sir Watson Cheyne (P.R.C.S. 1914–1916), Sir George Makins, G.C.M.G. (P.R.C.S. 1917–1919), and Sir Anthony Bowlby, Bt. (P.R.C.S. 1920–1922).

The actual motion placed before the first meeting (1920) that the Association should be formed was proposed by Sir Rickman Godlee and seconded by Sir George Makins.

It is recorded that: " The objects of the Association shall be the advancement of the Science and Art of Surgery and the promotion of interchange and friendship among surgeons of Great Britain and Ireland ".

The first meeting was held in London at the Royal College of Surgeons with Sir John Bland Sutton, Bt., as President, who gave the inaugural address on 13th May 1920 on " Science and Surgery " (*Brit. J. Surg.* 1920 **1**, 5).

He concluded his remarks with the words: " Before all things let us remember that fellow craftsmen should not be in competition, but comrades of the same honoured craft or guild ".

The result of the meeting was such that those attending it immediately appreciated the advantage of such an Association to the members and the progress of British Surgery.

When Moynihan was President at the meeting at Leeds in 1926, his health was proposed at the dinner by Sir George Makins, who said that if, three years before, anyone had told him that the surgeons of this country could be brought together in amity in such a fashion as he had seen for himself during the meeting, he would not have believed him. He then paid a well deserved tribute to the President, which the latter never forgot.

The Association used to award a Moynihan Scholarship, but now awards annually a " Moynihan Prize " for the best essay on a set subject.

The Collar and Jewel worn by The President of the Association of Surgeons of Great Britain and Ireland

This was presented to the Association in 1924 by Lord Moynihan. It is of hand chiselled 18 carat gold and bears the following inscription:

" I was wrought by Omar Ramsden by command of Sir Berkeley Moynihan, Bt., K.C.M.G., C.B., M.S., F.R.C.S. in the year of our Lord M.C.M.XXIV in homage to Lister the founder of modern surgery. I mark the office of President of the Association of Surgeons of Great Britain and Ireland."

The centre of the badge is occupied by the head of Lord Lister in low relief in an octagonal reeded frame. Surrounding this are two branches of delicately carved oak with interlaced ribbon bearing the title " The Association of Surgeons of Great Britain and Ireland". Above the branches appear the shields and crests of Lister and Moynihan. The Collar of " SS " consists of thirty-four links upon which the names of the various presidents are inscribed and it is joined at the back by two SS hooks. The weight of gold is $6\frac{3}{4}$ oz. troy.

At the meeting when a new President is installed the retiring President places the chain of office round the neck of his successor, at the same time reciting the words:

" Mr. President

I place upon your shoulders
The Badge of Honour
The Emblem of Leadership
The Reward of Service
A Tribute from your Colleagues."

The Gavel used by The President of the Association of Surgeons of Great Britain and Ireland

" At the opening ceremony of the meeting of the Association of Surgeons of Great Britain and Ireland held in Glasgow May, 1927, Mr. Thomas Kay, then the senior surgeon at the Royal Infirmary, presented a gavel to the Association for the use of the President at meetings. Under the body of the gavel is a silver plaque recording that it is made from wood obtained from the Lister Ward in the Royal Infirmary when it was dismantled to make room for urgent alterations. Round the thickest part of the handle is a silver band recording that the gavel was the gift of Mr. Thomas Kay.

Thomas Kay was surgeon to the Royal Infirmary at Glasgow. He was a Fellow of the Glasgow Faculty and a Colonel in the Territorial Army Medical Service. He saw service in South Africa during the Boer War and won the D.S.O. in the first World War being mentioned three times in Dispatches. He was Honorary Surgeon to the King (1927–29), and died on 20th April 1938." (*Brit. med. J.* 1938 **1**, 1029.)

Epilogue

The President, Sir Cuthbert Wallace, and Council of the Royal College of Surgeons invited the resuscitated French Academy of Surgery to visit them in July 1936. At the reception at the College the President of the Royal College and the President of the Academy both spoke of their common aim, which was the advancement of surgery.

The closing scene in Berkeley Moynihan's career then occurred. It took the form of a presentation to him by the Editorial Committee of the *British Journal of Surgery* to commemorate the recognition of his services as their Chairman since the inception of the Journal (1913).

The presentation consisted of:

(1) His portrait, which is now in the Royal College of Surgeons of England.

" The paucity of the words of the inscription is the most eloquent way of admitting that it was impossible to describe the greatness of his services."

(2) The gift of a cheque for one thousand guineas to be given by him to the Royal College of Surgeons for the purpose of research.

(3) A silver statuette by Omar Ramsden of a young man standing on a crystal globe holding above his head an open book of gold bearing the words, " The British Journal of Surgery 1913–1935 ". This statuette, in the words of Sir Cuthbert Wallace, symbolizes " the everlasting vigour and youth of surgery".

Berkeley's son, the present Lord Moynihan, presented a replica to the Journal, which is displayed before the Chairman at each meeting of the Editorial Committee.

Berkeley died on 7th September 1936. His funeral service was conducted on 10th September in the Parish Church at Leeds by the Bishop of Wakefield and a memorial service was held at St. Martin in the Fields, London, on 14th September. The church was full and the route to the cemetery at Lawnswood, Leeds, was lined with mourners and members of the community he had served.

" His son was asked by the Dean and Chapter to allow Berkeley to be buried in Westminster Abbey, the supreme and final honour that the British people bestow upon the tiny group of its most illustrious sons, but the family found themselves unable to accept this high distinction."

We must and do respect the decision of the family, but it would have been impressive and fitting for succeeding generations of surgeons if all that could die of John Hunter, Joseph Lister and Berkeley Moynihan, who had interpreted and expressed Hunter's ideals and Lister's practice with such universal appeal, had rested in close proximity in the one cemetery worthy to contain their remains. " In that temple of silence and reconciliation where the enmities of twenty generations lie buried in the Great Abbey which has during many ages afforded a quiet resting place."

" It would not have been Berkeley's wish to have been buried elsewhere than in Leeds. Leeds had been his home, his love, and the scene of the long march of his endeavour from obscurity to fame."

He had received the Freedom of the City. In 1924, at the coming of age of the University of Leeds, the opportunity was taken on 16th December to award him the degree of LL.D. (Honoris Causa). During the celebrations to mark the coming of age of the University he gave an address on " Medicine in Leeds " at a reception in the Medical School.

His portrait was presented to him by the Lord Mayor and Corporation on 7th November 1927 in the Lord Mayor's parlour.

On that occasion he said:

"This has been made possible largely due to Leeds, its opportunities, its encouragement and loyalty of friends. It was the fame of Leeds that attracted me, the higher tradition of Leeds which inspired me, it is the approval of Leeds, marked so signally today, which is my most acceptable reward."

He founded a Moynihan Lecture in London and one in Leeds in memory of his mother.

What were the contributions of Moynihan to surgery?

They are summarised:

(1) He was the first to break away from the old filthy traditions of the operation rooms by introducing, as much as possible, absolute cleanliness and sterility by using sterile towels, coats, caps, masks, rubber gloves, etc. This ritual is now universally practised and can be observed in all operation rooms. He founded the team work and spirit in surgery in this country based on what he had observed in Halsted's clinic in Johns Hopkins.

(2) His name stands for gentleness in surgery, for caressing tissues, rather than grasping or gripping them.

(3) He was the first to use blood transfusion successfully as a routine.

(4) He was the first British surgeon to excise successfully a subclavian aneurysm. Leonard Braithwaite was the second.

(5) He was the first British surgeon to perform a complete gastrectomy.

(6) He was the first in Britain and fourth in the world to operate on a chronic duodenal ulcer.

(7) He was the first to deal with an anastomotic ulcer following gastro-jejunostomy.

(8) He shared with Sampson Handley (Middlesex) the credit for the first operation of arterial embolectomy.

(9) He founded the Chirurgical Club, *The British Journal of Surgery* and the Association of Surgeons of Great Britain and Ireland.

(10) When he was elected President of the Royal College of Surgeons of England (1926–1932) he regarded the Royal College of Surgeons not merely as an Examining Body possessing a unique Museum and a working Library, but as a living force promoting the advance of surgery. As a result, the College is now a living, vital and productive centre of research containing a spirit of enquiry, an atmo-

sphere of progress and restless energy with a great responsibility to infuse and foster a new scientific outlook into the whole framework of surgical practice.

(11) He was instrumental in the establishment of the Army Medical Advisory Board. His lecture tour in the U.S.A. in 1916, at the request of the Director General, turned indifference into enthusiasm for the cause of the Allies.

The July 1937 number of the *British Journal of Surgery* was dedicated to

"The Right Honourable Lord Moynihan of Leeds, K.C.M.G., C.B., in recognition of his services to the Journal and to Surgical Research."

Mr. Rutherford Morison of Newcastle on Tyne also added a personal note of appreciation. It reads:

"Though Lord Moynihan's skilful and beautiful operations will not soon be forgotten, my feeling is that the future will attach more importance to the founding of the Moynihan Chirurgical Club. He has drawn together a group of the rising younger surgeons to educate themselves by meeting twice a year; once to spend a week together in the hospitals abroad and the second time in a daily visit to a hospital in which one of them works. It is difficult to over-estimate the value of this experience not only to the surgeons and their patients but to the whole community."

The members of the Moynihan Chirurgical Club enjoy great privileges, but bear also the great responsibility which accompanies them, namely to maintain the ideals which prompted its foundation. The members at one time taught and examined at least two-thirds of the number of medical students entering for the Final Qualifying Examinations, perhaps today it is only half the total number.

The foregoing record is no mean accomplishment for a man who "was never busy, but merely occupied".

E. F.

REFERENCES

The Moynihan Memorial Number (1937), *University of Leeds Medical Magazine*, **7**, 1-116.

The Moynihan Memorial Number (1936), *British Journal of Surgery*, **24**, 1.

BATEMAN, D. (1940) *Berkeley Moynihan, Surgeon*. Macmillan, London.

GORDON-TAYLOR, Sir G. (1940) *University of Leeds Medical Magazine*, **10**, 126-138.

THE COLLEGE APPEAL

ON SUNDAY, 25TH JANUARY, the President, Professor Sir James Paterson Ross, Bt., K.C.V.O., made an appeal for funds on behalf of the College in the B.B.C.'s "Week's Good Cause" programme. The following is the text of his broadcast:

"'An appeal on behalf of the Royal College of Surgeons of England'—I can almost hear some of you saying, 'Surely that is the concern of the National Health Service: Charity begins at home'.

"Now it is because the College is *not* supported by the State, and because Charity *does* begin at home that I am appealing to you tonight, for there are few homes in England and Wales that have not benefited from the work of the Royal College of Surgeons.

"I say this because if any of you needs an operation, it will almost certainly be performed by someone holding the Fellowship of the College. This can only be obtained after a long apprenticeship and two searching examinations. Even after the examinations there are years of training before a surgeon can become a consultant (that is, a 'specialist'), and on every selection committee for the appointment of a Hospital surgeon, one of our Fellows sits as the College representative to assess the competence of the candidates. In short, the College is concerned with the standards of surgery, and not with the welfare of surgeons.

"Since its foundation over 150 years ago, the College has been responsible for maintaining the priceless Hunterian Collection of museum specimens, and a great medical library. During the second world war the College was bombed and almost completely destroyed. The Council decided that in rebuilding they would show their faith in the future and enlarge the College to nearly three times its pre-war size. This would provide laboratories for research, and lecture rooms as well as museums for teaching, though it was realized that they would have to raise new money for building and maintaining the restored College.

"Though the rebuilding is not yet complete, teaching is in full swing, and every year 1,000 doctors pass through the College. They take courses in surgery, dental surgery and anaesthetics, and also in anatomy, physiology, biochemistry, pathology and pharmacology. This is all part of their training to become specialists in various branches of surgery.

"Teaching departments cannot flourish unless they are undertaking research to advance knowledge; and as our scientists are trying to improve the methods of giving anaesthetics, and also to speed up the healing of wounds, their work benefits practically everyone. Some of the pioneer work which led to open heart surgery was done in our laboratories, and the same applies to the attempts to graft healthy organs into the body to replace diseased ones. Two of our departments are engaged in cancer research and others are investigating inherited blindness, and also infections of the teeth and jaws, in the hope of preventing these diseases.

"Thus the College is more active than ever before in its history and is doing its utmost to cultivate the science as well as the practice of surgery, but the work is very costly: and please remember the College is one of the few remaining medical Charities. One of the very few ways in which a medical Charity can contribute towards earning its own living is from examination fees, yet our revenue from this source covers only about an eighth of what we spend on our scientific work. We need £350,000 for the final phase of the rebuilding, plus an extra £150,000 a year for maintenance. Our own Fellows have subscribed generously and we have had several large gifts from friends in business and industry: yet there is an opportunity also for those who can afford only a modest sum. If all of you who have benefited from surgery would send just what you can afford, we should have all we want. So please send what you can to me at the Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2."

Over 1,400 contributions have been received to date in response to this appeal and they are continuing to come in. The final total cannot yet be stated, but will exceed £4,072.

ADMISSION TO THE HONORARY FELLOWSHIP

Professor John Bruce, holding his diploma of Honorary Fellowship, with Mrs. Bruce.

AT THE MEETING of the Council on 11th February, Professor John Bruce, C.B.E., T.D., President of the Royal College of Surgeons of Edinburgh, was admitted to the Honorary Fellowship. The citation in his honour was delivered by Sir Arthur Porritt, K.C.M.G., K.C.V.O., C.B.E., who spoke as follows:

" Mr. President, Members of Council:

" Friendship is always a possession beyond price, and its value—like that of good wine—increases with age.

" I would venture to say, without fear of contradiction, that no man has ever stood in this room to receive his Honorary Fellowship surrounded by more real friends than does John Bruce today. It is for that reason, if none other, that I feel particularly privileged to be permitted, on your behalf, to express in some measure our unanimous feelings of affection and esteem.

" John Bruce is, above all things, a friendly person; in his professional career, in his social life, in his military activities, in his surgical pilgrimages, even in his Presidential Chair, it is his ability to give and to inspire friendship which dominates his whole life. He exudes a joy of living which is infectious and makes it a delight to be with him at any time of the day or night! This all-pervading spirit of good fellowship—so obviously a natural gift—has allowed him to attain to heights, in the many and protean interests of his life, very rarely conquered at such a relatively early age.

" A rugged Scot—who in his every word and action belies the epithets ' dour ' and ' canny ' so often misapplied to his great race—his very name conjures up the deeds of derring-do of his royal namesake of the thirteenth century. From the outset of his university career at Edinburgh, he proved himself a born leader. Academically brilliant, he compensated for not having to work particularly hard by taking a full part in every extra-curricular student activity he could lay his hands on. He played Rugger vigorously; he rejuvenated the Conservative Club—not only politically; he was a keen member of the O.T.C. and, in leading all student group activities (not all perhaps directly in line with accepted precepts of university discipline), he early showed signs of being what he is now well-known to be—an excellent chairman of meetings and a superb and eloquent speaker (especially post-prandial)!

" He qualified with honours and distinction, the most popular student of his year. Before that happy day, and much more intensively after, he came under the influence of that great Regius in Edinburgh—Sir John Fraser. Study photographs of the two at comparable ages and you will find them almost indistinguishable. John Bruce's surgical technique is John Fraser's technique; John Bruce's teaching is John Fraser's teaching; John Bruce's figure is almost John Fraser's figure!

" And what better mentor could any brilliant young surgeon have found? How fitting it is that John Bruce should now be filling that same Regius Chair, with which onerous task he also combines the equally responsible one of President of the Royal College of Surgeons of Edinburgh—surely an unique double.

" Two other great surgeons of the Scottish School—McMurray and Norman Dott—have also undoubtedly influenced the surgical life of John Bruce but, avoiding both the Scylla of Orthopaedics and the Charybdis of Neuro-surgery, his strong individuality took him on the staffs of the Western General and the Edinburgh Royal as a general surgeon—in which wider field he has deservedly attained world-wide renown and distinction. In this connection, Mr. President, I think it worthy of note (especially perhaps in this College and this room) that, throughout his surgical career and in his many writings, his teaching and his practice, John Bruce has proved himself an ardent and most able disciple of the anatomical tradition of another illustrious Scot—John Hunter.

" Already, his tenure of the Presidential Chair in our Sister College has marked the beginning of a new epoch in Edinburgh surgery—new buildings, postgraduate courses, constructive revision of Council administration, to say nothing of a new and flourishing publication—*The College Journal* (edited *and* managed by the President)—all stem from the fertile and stimulating brain of a certain John Bruce.

" This (perforce abbreviated) record would be woefully incomplete without some mention of John Bruce's outstanding war record. Before the outbreak of war, he was largely responsible for the recruitment of what became, in 1939, the 2nd Scottish General Hospital (T.A.) and, as its surgical chief, he saw gallant service in the brief but abortive campaign in Norway. It was, however, later in India and even more so in Burma, as Consulting Surgeon to General Sir William Slim, that he really came into his own. His natural courage, his dynamic initiative, his phenomenal stamina, his love and understanding of men, his sure and practical appreciation of surgical problems (both technical and administrative) were all ideally suited to that arduous and difficult campaign. It was not surprising that he was beloved and respected by all ranks, from Commanders-in-Chief to privates, for his personal bravery, his sound advice and his stimulating personality undoubtedly did much to boost the morale of that hard-pressed army.

He became, and is, a close personal friend of Slim's—and of hundreds of other good men and true who fought that sticky, fearsome jungle war and who remember the never-failing cheerfulness and stimulus of their Consulting Surgeon. The award of Commander of the Order of the British Empire represents, to them, the highest form of D.S.O.—how well-deserved they know and we can guess.

" To those of us (and we are but a handful amongst a host of world-wide visitors) who have experienced the open-handed and warm-hearted hospitality of 26 Moray Place—the knowledge that John Bruce (or rather, I should say, John Bruce and his lady, who we are delighted to have with us today), are unsurpassed as host and hostess is now really traditional.

" J.B. has only two hobbies—people and fish! Both get treated with the same intense concentration, which is his method of relaxation. The only difference is that the process is to the inestimable advantage of the former and the dire detriment of the latter.

" I will forbear any detailed mention of his poetic inclinations—but he has, in fact, written some very good poetry, perhaps his best being produced for that very select social and dining club in Edinburgh known as the " Monks of St. Giles ". Incidentally, in this club each member takes a monastic name and, perhaps, it is significant that that of John Bruce is ' Father Malleus '—the Hammer of the English!

" So, Mr. President, here stands with us today John Bruce, a man of high ideals, of great intellectual attributes, of immense capacity for work; a man of moving eloquence, of positive courage, of a hundred-per-cent loyalties—a great man and a good friend. This College can indeed count itself fortunate in being about to number amongst its Fellows such an one.

" Mr. President—with delight and great appreciation I present to you, to receive at your hands the Honorary Fellowship, Professor John Bruce, President of the Royal College of Surgeons of Edinburgh."

After the President had admitted him to the Honorary Fellowship, Professor Bruce addressed the company thus:

" Mr. President, Sir Arthur Porritt, Gentlemen:

" I am very sensible of the great honour you have conferred on me today in admitting me to Fellowship with you, and very moved by this gesture of friendship both to me personally and to your Sister College in Edinburgh.

" In recent years identity of purpose and mutual regard have brought our two corporations closer together than ever before in their long histories, and, while I am very proud of my own College and its splendid traditions and heritage and contributions to surgery, I have no doubt at all that here in Lincoln's Inn Fields lies the centre for surgery in the English-speaking world. I am very proud of the signal distinction to which you have admitted me. I feel I am not personally worthy of a place on the long roll of distinguished Honorary Fellows you have admitted in the past years, but I do venture to assure you that I will not be lacking in affection or admiration or loyalty in this new alliance.

" It has given me great pleasure that my introduction should have been made by my old friend, Sir Arthur Porritt, expressed in terms which were flattering and all too generous. I am very honoured that I should receive it at the hands of you, Mr. President, who have so rightly earned the affection of the whole surgical world. I am very grateful to you all for this honour, and from the bottom of my heart I say thank you very much indeed."

ANATOMICAL MUSEUM

THE SPECIAL DISPLAY for the month of March consists of a series of oil paintings depicting incidents in the life of Charles Darwin. These were presented by Dr. A. E. Kohts, the Curator of the Darwin Museum in Moscow, to mark the anniversary of Darwin's birth, 12th February 1809.

PROCEEDINGS OF THE COUNCIL

AT A MEETING of the Council on 11th February 1960, with Professor Sir James Paterson Ross, Bt., President, in the Chair, Professor John Bruce, President of the Royal College of Surgeons of Edinburgh, was admitted to the Honorary Fellowship. A separate account is published on page 196.

The Honorary Medal of the College was awarded to Sir Cecil Wakeley, Bt., Past President. The stated grounds of the award are as follows:

"In recognition of his distinguished labours on behalf of the College over a long period including the five years of his Presidency, and as a tribute to his success as the Editor of the *Annals*, to his untiring and vigorous devotion to the affairs of the College in all its departments and to the remarkable aura of friendliness which distinguishes all his endeavours."

Mr. J. D. T. Jones of Newcastle (General Surgery), Mr. R. G. Macbeth of Oxford (Otolaryngology) and Mr. A. G. Cross of St. Mary's Hospital and Moorfields (Ophthalmology) were admitted as Members of the Court of Examiners.

Elections to the Court of Patrons were made, and the new Members are:

Sir Cecil Wakeley, Bt.
Sir Harry Platt, Bt. } both Past Presidents

Sir Zachary Cope, who has recently written the history of the College

Mr. W. A. Innes, a great benefactor

Mr. C. R. Coleman of Leicester, who has endowed the Lilian May Coleman Fund for Cancer Research

Dr. Cuthbert Dukes, O.B.E., was appointed the Thomas Vicary Lecturer for 1960.

A Hunterian Professorship was awarded to Mr. P. M. Weston of University College of the West Indies on "Pathology and treatment of urethral structures and its complications in Jamaica".

Dr. Bertram Cohen, who is at present working in the College as Leverhulme Senior Research Fellow, was appointed as the first Nuffield Research Professor of Dental Science, and will take office on 1st October 1960.

Dr. G. V. R. Born, now at the Nuffield Institute for Medical Research at Oxford, was appointed as the first Vandervell Professor of Pharmacology, which is a chair recognized as such in the University of London, and he will take up his appointment on the 1st April.

The following were elected to the Fellowship *ad eundem:*

Isabella Forshall of Liverpool
P. G. C. Martin of London
G. E. Moloney of Oxford
A. W. Kay of Glasgow

The Hallett Prize was awarded to J. C. Doyle of the University of Melbourne on the result of the recent Primary Fellowship Examination

in this country, and to Miss Indra Sri Skanda Rajah of the University of Ceylon, who was successful at the Primary Fellowship Examination in Ceylon in January.

Handcock Prizes were awarded to S. J. McDonald of Charing Cross Medical School and to D. R. Harvey of Guy's Hospital Medical School on the result of the recent final examination in Surgery for the Membership of the College.

Diplomas of Fellowship in Dental Surgery were granted to 18 candidates and diplomas of Fellowship in the Faculty of Anaesthetists were granted to 46 candidates. 146 diplomas of Membership were granted.

Diplomas were granted, jointly with the Royal College of Physicians, in the following subjects: *Anaesthetics* (1), *Medical Radiotherapy* (2), *Psychological Medicine* (1), *Child Health* (1), *Industrial Health* (13).

The following hospitals were recognised under paragraph 23 of the Fellowship Regulations:

Hospitals	Posts Recognized		
	General (6 months unless otherwise stated)	Casualty (all 6 months)	Unspecified (all 6 months)
London—St. Stephen's Hospital, Fulham Road (additional)		Casualty Officer	
Antrim—Massereene Hospital	Res. S.H.O.		
Bromsgrove—General Hospital	Registrar		
Griffithstown—County Hospital (additional)			S.H.O. (Traumatic and Orthopaedic)
Northampton—General Hospital (additional)	2 Registrars		
Tunbridge Wells — Pembury Hospital (additional)	*Redesignation of* H.S. post *as* Registrar, S.H.O. or H.S.	Cas. Officer and Sen. Orth. Hse. Surgeon	
Newtownards—Ards Hospital	S.H.O. 2 H.S.	J.H.M.O. (Cas. and Gen.)	
London—Lewisham Hospital (additional)		Cas. Officer (S.H.O.)	
Newcastle—General Hospital (redesignation)	*Redesignation of* S.H.O. *as* Registrar		
Birkenhead—General Hospital (additional)	*Delete* Sen. H.S. *Add* 2 H.S.		
Paddington — General Hospital (additional)			Orth. Reg.
Australia—Footscray and District Hospital	*Delete* H.S. *Amend* Sen. Surg. Reg. post recognized for 12 months		
Ceylon—Ratnapura Hospital	H.S.		H.S. (Thoracic)

DONATIONS

During the last few months the following generous donations have been received :

Appeal Fund—Donations:

£1,050	General Accident Fire & Life Assurance Co., & General Life Assurance Co.
£500	Cazenove & Co.
£270	Perez Ltd. (effects of the late W. R. Gibbs)
£262 10s. 0d.	Percy Levy, Esq.
£250	R. Nivison & Co. Anonymous donation
£210	W. Greenwall & Co.
£105	Laurence, Keen & Gardner Grieveson, Grant & Co. Durlacher, Godson & Co. Sir Ivan Whiteside Magill, K.C.V.O. William H. Hart & Co.
£100	D. R. McDonald, Esq. David A. Bevan, Simpson & Co. C. Hoare & Co. The Grocers Company Executors of the late Rt. Hon. Baron Austin (further donation)
£52 10s. 0d.	Maguire, Kingsmill & Co. A. Sherriff & Co. Dix & Maurice
£50	Kenrick & Jefferson, Ltd. W. I. Carr, Sons & Co. Miss B. Underhill Nathan & Rosselli Hedderwick, Hunt, Cox & Co. Bruce & Hinton Charity Trust
£26 5s. 0d.	Greener, Dreyfus & Co. Foster & Braithwaite. Samuel Clark, Esq. Robert Wigram & Co.
£25	Liverpool Clerks Association Govett Sons & Co. Charitable Trust
£21	Fergusson & Clark J. T. Lee & Co. The Tap & Die Corporation Ltd. Leon Brothers
£15 15s. 0d.	Sheppards & Co.
£10 10s. 0d.	W. Fearnehough, Ltd. W. D. Keightley F. K. R. Coldstream Moir & Shand Chase, Henderson & Tennant Saccone & Speed, Ltd. Oxley Knox & Co.
£9 5s. 8d.	The Broderers Company
£8 13s. 0d.	The Marick Singers
£5 5s. 0d.	K. G. Groves, Esq. Joseph Gray & Son, Ltd.

£5 5s. 0d.	J. R. Hebditch, Esq. W. Ford Hall T. C. Boon, Esq. Law & Roos Service Co. The Deighton Motor Co. Ltd. L. Hancock & Co. Poldens, Ltd. Wilhains, de Broë & Co. Smithers & Co. Harold Ruttle, Town & Co. Richardson & Glover Hilton, Gibbes, Hutchinson Scott & Co. Wilson & Waterford Mrs. M. Ross Bailey & Law
£5	H. I. Weldrick, Esq. H. M. Coats, Esq. Wm. Monks (Builders Merchants), Ltd. Frank Palmer & Sons White & Cheeseman Murton & Adams Service Co. Cooplands (Doncaster) Ltd. E. Minty, Esq.
£3 3s. 0d.	L. A. Seligmann & Co. Taylor & Colbridge C. A. Price, Esq. Smith Bros. (Caer Conan) Wholesale, Ltd.
£2 15s. 0d.	Stock Issue Section of General Electric Company
£2 2s. 0d.	Goodye Blackburn, Ltd. J. Colyer (Furnishers), Ltd. J. W. Northend, Ltd. S. R. Scott, Stratten & Co. Longman Towsey & Co.
£1 1s. 0d.	T. A. Wood, Esq. Benjamin Peel, Esq. Davis, Lloyds & Wilson
£1	A. L. Simpkin Co. Ltd.
10s. 0d.	Mr. & Mrs. R. Duck M. Walker, Esq.
5s. 0d.	Anonymous donation

Appeal Fund—Covenants:

£25 p.a. for 7 years + tax	Richard Gordon, Ltd.
£10 p.a. for 7 years	Redland Holdings, Ltd.

Restoration and Development Fund:

£5,000	Agnes Spencer Charitable Trust (further donation) Miriam Sacher Charitable Trust (further donation)
£1,000	Alec Lerner Charitable Trust (further donation)
£245 8s. 0d.	Sir Russell Brock, F.R.C.S.

Furnishing of New Committee Room:

£100	Faculty of Radiologists
£56 10s. 0d.	*British Journal of Surgery*

Voluntary annual subscriptions and donations by Fellows:

The following Fellows of the College, Fellows in Dental Surgery, and Fellows in the Faculty of Anaesthetists have generously given donations or have undertaken to make a voluntary annual subscription under Covenant to the College:

J. C. Ainley-Walker, F.F.A.R.C.S.
D. V. Bateman, F.F.A.R.C.S.
M. Bates, F.R.C.S.
H. J. Brennan, F.F.A.R.C.S.
J. E. Coolican, F.R.C.S.
F. C. Dwyer, F.R.C.S.
C. L. Endicott, F.D.S.R.C.S.
Frankis T. Evans, F.F.A.R.C.S.
J. Gillies, F.F.A.R.C.S.
A. M. Hatton, F.F.A.R.C.S.
I. D. Jones, F.F.A.R.C.S.
T. Keith Lyle, F.R.C.S.
R. Machray, F.F.A.R.C.S.
R. E. Mansfield, F.F.A.R.C.S.
F. Mitchell-Heggs, F.R.C.S.
A. F. Murphy, F.R.C.S.
M. W. Lloyd Owen, F.F.A.R.C.S.
H. H. Pinkerton, F.F.A.R.C.S.
N. M. Priestley, F.F.A.R.C.S.

A further list of donations received will be published in the April issue of the *Annals*.

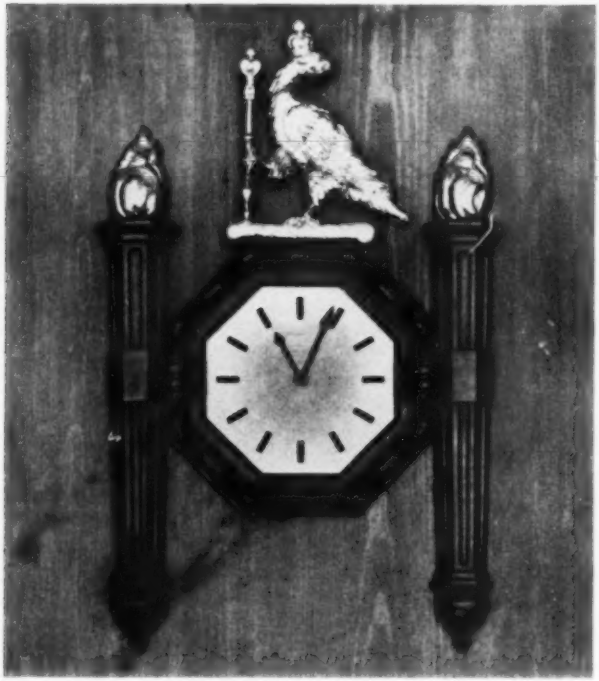
ASSOCIATION OF SURGEONS OF INDIA

THE 21ST ANNUAL CONFERENCE of the Association of Surgeons of India and the Indian Society of Anaesthetists was held at Jaipur from 27th to 31st December 1959. Some three hundred surgeons and anaesthetists attended the meeting, those from abroad including Dr. Michael De Bakey, U.S.A., Sir Harold Gillies and Mr. E. G. Muir, Great Britain, and Professor Uglouv of the U.S.S.R. The inauguration was attended by the Chief Minister and the Health Minister for Rajasthan and addresses were given by Dr. S. K. Sen of Delhi, President of the Association of Surgeons, and Dr. P. D. Dhameja, President of the Association of Anaesthetists. The surgical proceedings which followed were divided into sections of General Surgery, Orthopaedics, Thoracic Surgery and Plastic Surgery, and over fifty papers were read on a wide variety of subjects. One Clinical Session was held, a demonstration of cases by the Orthopaedic Section, and this, as it has done with our own Association, proved so successful that it might well be extended to other sections.

Social activities were not forgotten: a reception was held at Government House, there was a display of Rajasthan singing and dancing, the Annual Banquet was held and excursions arranged to places of interest in the neighbourhood of Jaipur. Any Fellow of our own Association of Surgeons who is able to attend this annual meeting can be assured, not only of several days of interesting surgical discussion, but also of a great welcome and the most delightful hospitality. E. G. M.

"OBSERVABLES" AT THE ROYAL COLLEGE OF SURGEONS

44. The Committee Room Clocks



Committee Room wall clock.

OF THE OBSERVABLE objects in an institutional building, clocks are more observable than most, particularly when they are in a Committee Room!

Thus it is a happy thing to record that the two new Committee Rooms in the College are both embellished by a handsome case surrounding the face of the electric clock. These were carved by a Fellow of the College, Mr. W. D. Park of Shenfield, who generously offered his services as a labour of love. He executed his carving in pear wood, which stands out handsomely in bold relief from the panelling of the rooms, to which it has been attached. In the design the dial of each clock is flanked by a pair of torches and surmounted by the Crest of the College. The flame of the torches and the Crest have been gilded to bring them into greater prominence.

THE COMMITTEE ROOM CLOCKS

Of the two Committee Rooms concerned, one is in general use for the several committees of the College, and the other is mainly used by the specialist surgical associations who are members of the Joint Secretariat provided for them under the aegis of the College. K. C.

APPOINTMENT OF FELLOWS AND MEMBERS TO CONSULTANT POSTS

L. T. SCOTT, F.F.A.R.C.S.	Consultant Anaesthetist to Lancaster and Kendal and Lancaster Moor Groups of Hospitals.
R. R. W. HILL, F.F.A.R.C.S.	Consultant Anaesthetist to Stockport and Buxton Group of Hospitals.
F. G. CHRISTENSEN, F.D.S.R.C.S.	Consultant Maxillo-Facial Surgeon to the South Brisbane General Hospital, Australia.
J. W. JACKSON, F.R.C.S.	Consultant Thoracic Surgeon to Harefield Hospital.

The Editor is always glad to receive details of new appointments obtained by Fellows and Members, either through the Hospital Boards or direct.

NEW COLLEGE PUBLICATIONS

Readers are reminded that two new publications are now available and may be ordered from the Librarian of the College or from any bookseller.

The History of the Royal College of Surgeons of England

The official history of the College, written by Sir Zachary Cope, F.R.C.S., and published by Anthony Blond, Ltd. Price 63s. a copy, postage 2s. The author has traced the development of the College from a City Livery Company to the progressive surgical institution that it is at the present time. There are biographies of distinguished surgeons and the volume is illustrated with more than 36 pages of plates. The Librarian has contributed a chapter on The Library, and Miss Jessie Dobson has written the history of the Hunterian Museum.

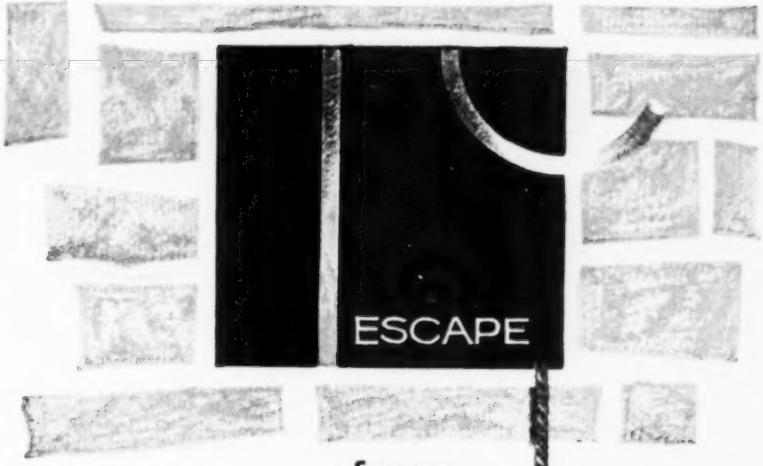
A New Catalogue of Portraits, price 30s. a copy, postage 1s. 3d. This new catalogue has been compiled by the Librarian of the College, Mr. W. R. Le Fanu, M.A., and contains descriptions of all the portraits and paintings in the College with details of their history. There are four coloured plates and over 100 black-and-white illustrations. Published by Messrs. E. & S. Livingstone.

DIARY FOR MARCH

Wed.	16		Board of Faculty of Anaesthetists.
		3.00	Annual General Meeting of Faculty of Anaesthetists.
		4.00	Dr. J. A. Lee—Joseph Clover Lecture—Joseph Clover and the contributions of surgery to anaesthesia.
Thurs.	17		Pre-medical Examination begins.
		5.00	Prof. A. E. Jones—Hunterian Lecture—Supervoltage X-ray therapy of intracranial tumours.
Fri.	18	5.00	Board of Faculty of Dental Surgery.
Tues.	22		Date of election of Fellows to the Board of Faculty of Dental Surgery announced.
		5.00	Mr. J. H. Peacock—Arris and Gale Lecture—Endocrine and metabolic aspects of peripheral blood flow and vasoplastic disease.
Wed.	23	5.00	Prof. H. H. Eddey—Hunterian Lecture—Cancer of the mouth.
Thurs.	24	5.00	Dr. A. G. Stansfeld—Erasmus Wilson Demonstration.
Sat.	26		Last day for applications for Annual Examinerships.
Mon.	28	5.00	Dr. R. A. Weale—Edridge-Green Lecture—The duplicity theory of vision.
Tues.	29		Date of Council Election announced.
			Final Membership Examination begins.
Wed.	30	5.00	Prof. J. D. Griffiths—Hunterian Lecture—The dissemination of cancer cells during operative procedures.
Thurs.	31	5.30	Mr. D. W. C. Northfield—Otolaryngology Lecture—Brain tumours.

DIARY FOR APRIL

Mon.	4		Surgery Lectures and Clinical Conferences begin.
		5.00	Prof. J. H. Hovell—Hunterian Lecture—The surgical treatment of mandibular prognathism with special reference to functional anatomical considerations in diagnosis and treatment planning.
Tues.	5	5.00	Prof. A. Sorsby—Ophthalmology Lecture.
Tues.	12		Last day for nominations of candidates (F.D.S.) for the Board of Faculty of Dental Surgery.
Thurs.	14		Election of Fellows and award of Jacksonian Prize.
		2.00	Quarterly Council.
		5.00	Mr. Leon Gillis—Joseph Henry Lecture—Arm prosthesis and appliances. Their functional value in industry.
Fri.	15		Good Friday. College closed.
Sat.	16		College closed.
Mon.	18		Easter Monday. College closed.
Tues.	19		Last day for nomination of candidates for the Council.
Wed.	20		Second L.D.S. Examination begins.
Thurs.	21	4.15	Dr. B. D. Wyke—Arnott Demonstration.
Fri.	22		Surgical Lectures and Clinical Conferences end.
		5.00	Prof. K. Bloor—Hunterian Lecture—Natural history of arteriosclerosis of the lower extremity.
Sat.	23		Last day for applications for Lectureships.
Tues.	26		Final Fellowship Examination (Ophthalmology and Otolaryngology) begins.
			Lectures and Clinical Demonstrations in Dental Surgery begin.
		5.00	Mr. T. Ward—Fractures of the facial bones: I.
		6.15	Mr. P. Clarkson—Surgical correction of deformities of the jaws.
Wed.	27	5.00	Dr. A. A. Barton—Arnott Demonstration—Wings.
Thur.	28	5.00	Prof. W. J. Metcalfe—Hunterian Lecture—Arterial embolism in the lower limbs.
		5.00	Mr. G. T. Hankey—Disorders of the mandibular joint.
		6.15	Mr. B. W. Fickling—The maxillary antrum in relations to dental surgery.
Fri.	29		Names of candidates (F.D.S.) for election to the Board of Faculty of Dental Surgery announced and voting papers issued.



from the enema

before and after surgery

Further confirmation of the ability of Dulcolax to replace effectively the troublesome enema is given in a recent paper in the Lancet. Rutter[1] observes that '. . . *in traditional surgery practice the number of patients . . . who escape having at least one enema . . . must be small indeed. In a . . . surgical ward under my care . . . a book is kept to record all enemas given. For the year 1958 . . . this book contains only five entries. The number of patients admitted to the ward during the year was 380 . . . and the saving of nurse-hours, and of patients' discomfort, represented by this outlawing of the enema has been considerable . . . The results with Dulcolax have been gratifying and impressive.*'

Rudd[2] recommends the routine of two Dulcolax tablets at night followed by a Dulcolax suppository in the morning. As shown by Clark[3], such a technique can greatly reduce or abolish the need for enema administration. Similar conclusions are drawn by Jeffcoate[4], Ganz and Zindler[5] and many other investigators in many parts of the world.

Dulcolax is available both in suppository and tablet form.

1 Rutter, A. G., *Lancet*, 1959, **i**, 1173.
2 Rudd, T. N., *Practitioner*, 1959, **182**, 728.
3 Clark, A. N. G., *Brit. med. J.*, 1957, **2**, 866.
4 Jeffcoate, T. N. A., *Nursing Mirror*, 1958, (Feb) **21**, 13.
5 Ganz, P., and Zindler, N., *Medizinische No.*, 1959, **29-30**, 1042.

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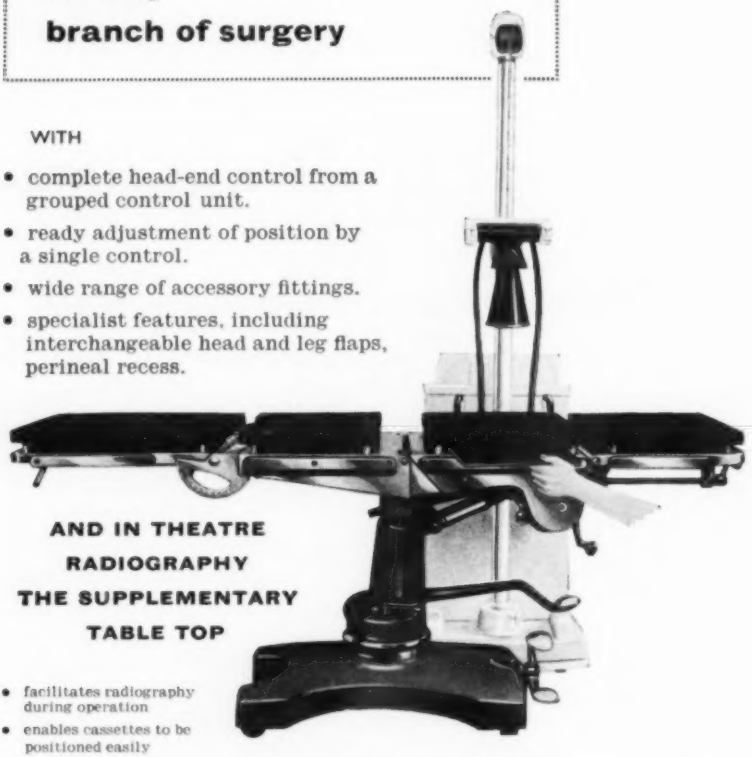

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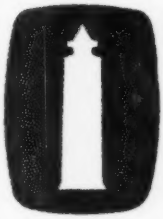

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AND

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